INDIANA TECHNICAL COLLEGE

FORT WAYNE
••INDIANA••

1938-39

INDIANA TECHNICAL COLLEGE
ITC
•1930•

OFFICERS AND FACULTY

A. T. KEENE, A. B., A. M., President

Wm. J. HESS, Vice President — PAUL E. HESS, Secretary

J. J. THEOBALD, Guidance Counsellor — I. M. PONTIUS, Registrar

ACADEMIC COMMITTEE

ROBERT C. RUHL — R. E. OSBORN — NORMAN BOURKE

ROBERT C. RUHL, Department of Civil Engineering

B.S.C.E., M.S.C.E., Purdue University.

R. E. OSBORN, Department of Electrical Engineering

B.S.E.E., Purdue University.

ALFRED H. WALBAUM, Department of Chemical Engineering

B.S.Ch.E., Purdue University; Graduate student University of Pennsylvania; Chemical Engineer, Universal Oil Products Co., 1927-1933.

NORMAN BOURKE, Department of Mechanical Engineering

A.B. University of Nebraska; B.S.M.E., Massachusetts Institute of Technology; M.S.M.E., M.E., Purdue University; Head Dept. of Mechanical Engineering, University of North Dakota, 1926-1932.

LEE P. HUTCHISON, Instructor of Mathematics

A.B., Grove City College; A.M., Ph.D., University of Kentucky.

WALDEN KUNZ, Department of Radio Engineering

A.B., Indiana University; formerly Assistant in Physics, Indiana University.

THOMAS M. SULLIVAN, Department of Aeronautical Engineering

B.Ae.E., University of Detroit; M.I.A.S. (Institute of Aeronautical Sciences); glider, flight and ground experience, University of Detroit and Municipal Airport, Pontiac, Michigan.

PAUL ANKRUM, Instructor of Electrical and Radio Engineering

B.S.E.E., Indiana Technical College; formerly Assistant in Mathematics, Ashland College.

ABNER S. TYSON, In charge of Machine Shop Courses

Drexel Institute; B.S.M.E., Indiana Technical College.

EDWARD MILDEBRANDT, Engineering Law and English

Graduate Berlin Normal School; Wisconsin State Teachers College; Instructor of English and Business Law, Anthony Wayne Institute, 1928-1932.

JOHN H. SLATER, Director Student Welfare

B.P.E., George Williams College; Ass't Instructor Biology, George Williams College; Secretary Boys' Work, Y.M.C.A., Fort Wayne, 1930-1934.

INDIANA TECH 1938


WATER POLO


STUDENT COUNCIL


TECHNICIAN STAFF


COMMENCEMENT MAY 26, 1937

ORCHESTRA


CONVOCATION


INDIANA TECH BRANCH FORT WAYNE SECTION AMERICAN INST. OF ELECTRICAL ENGINEERS


CHORUS


BASKETBALL

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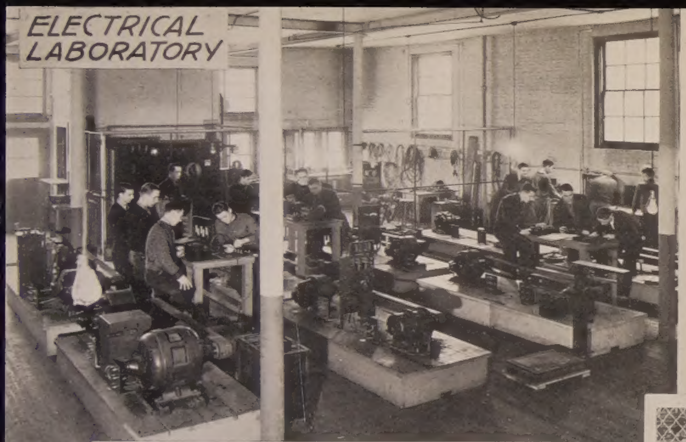
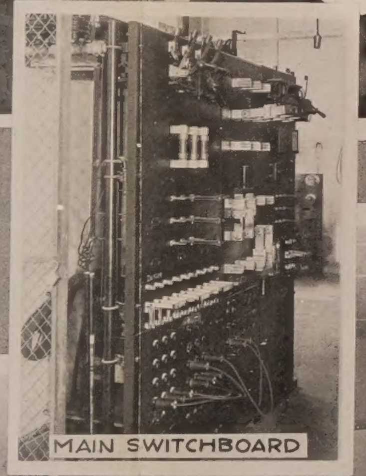
ELECTRICAL LABORATORY

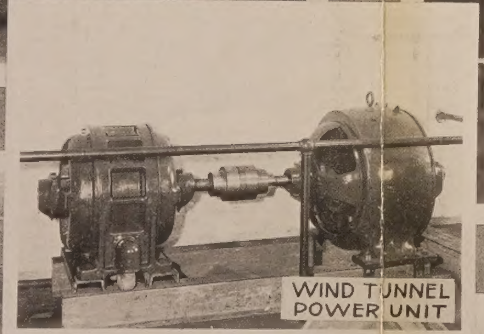


LECTURE ROOM

RADIO CODE

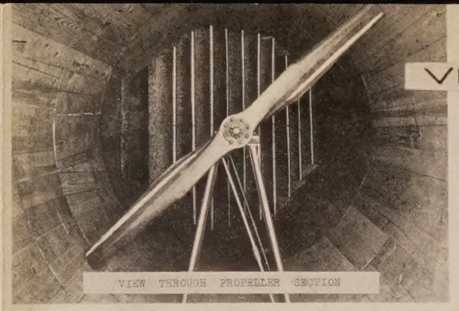


MAIN SWITCHBOARD

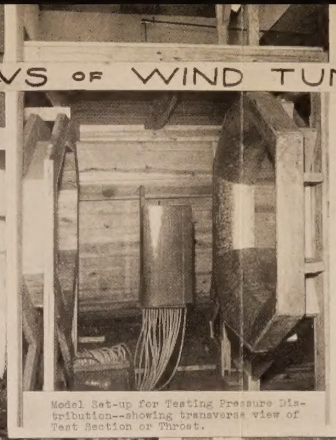


WIND TUNNEL POWER UNIT

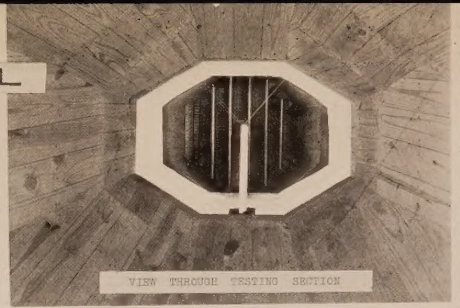
VIEWS OF WIND TUNNEL



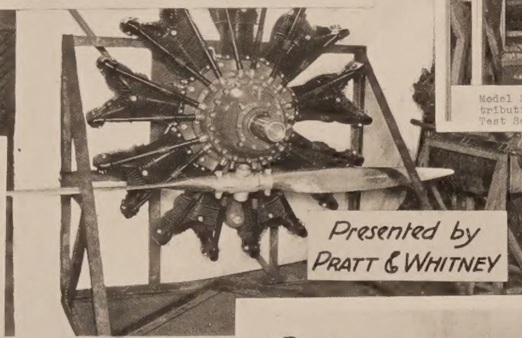
VIEW THROUGH PROPELLER SECTION



Model Set-up for Testing Pressure Distribution--showing transverse view of Test Section or Throat.

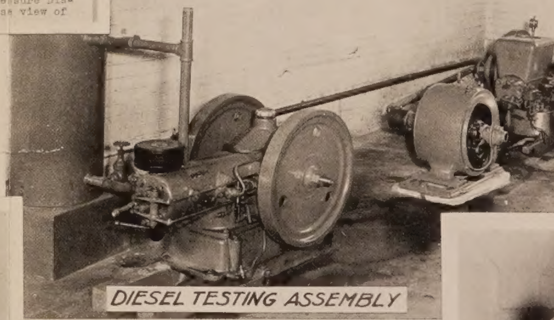


VIEW THROUGH TESTING SECTION



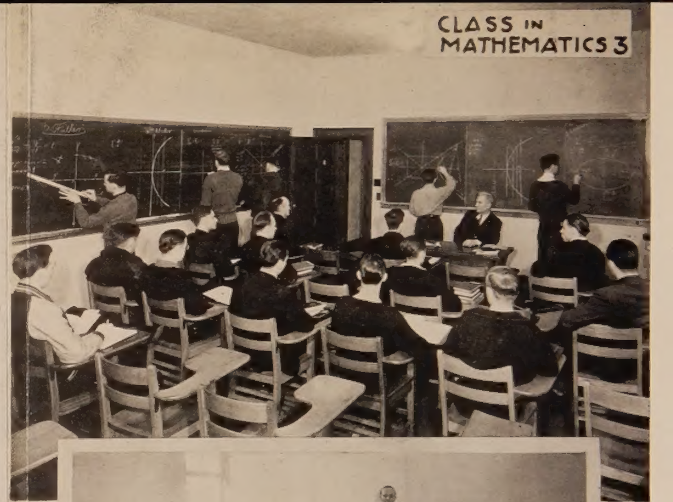
Presented by PRATT & WHITNEY

INDIANA TECHNICAL COLLEGE ENGINEERING FORT WAYNE IND.

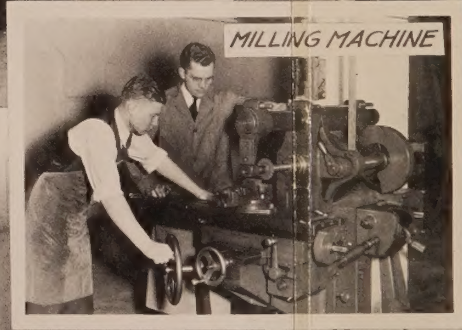


DIESEL TESTING ASSEMBLY

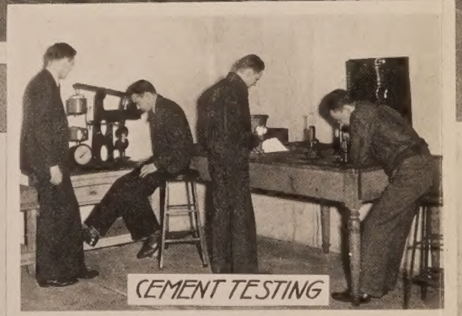
CLASS IN MATHEMATICS



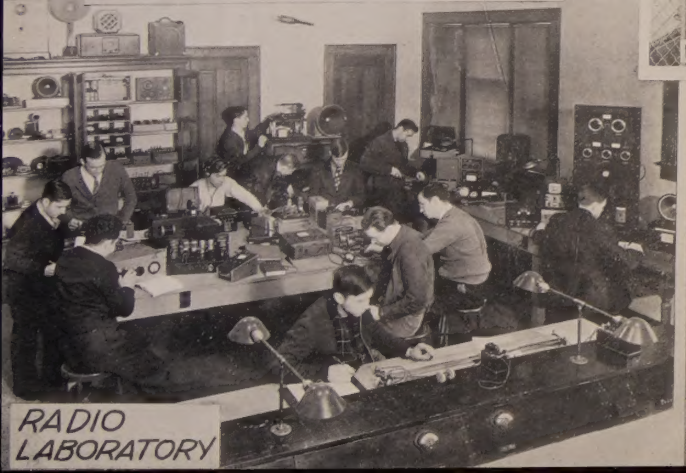
CLASS IN GEOLOGY



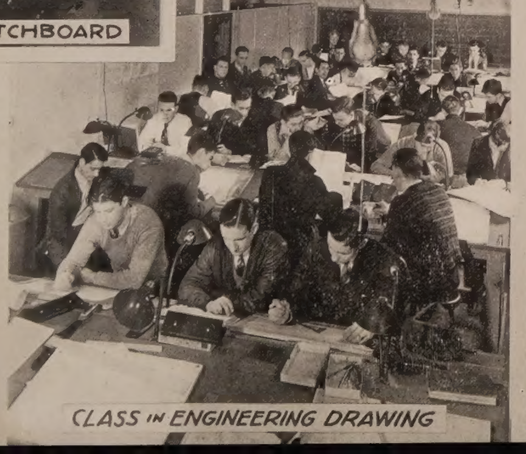
MILLING MACHINE



CEMENT TESTING



RADIO LABORATORY



CLASS IN ENGINEERING DRAWING

FIELD WORK IN SURVEYING

Chemistry Laboratory

MACHINE SHOP

INDIANA TECHNICAL COLLEGE

A School for Men

offering courses leading to the Degree of Bachelor of Science in

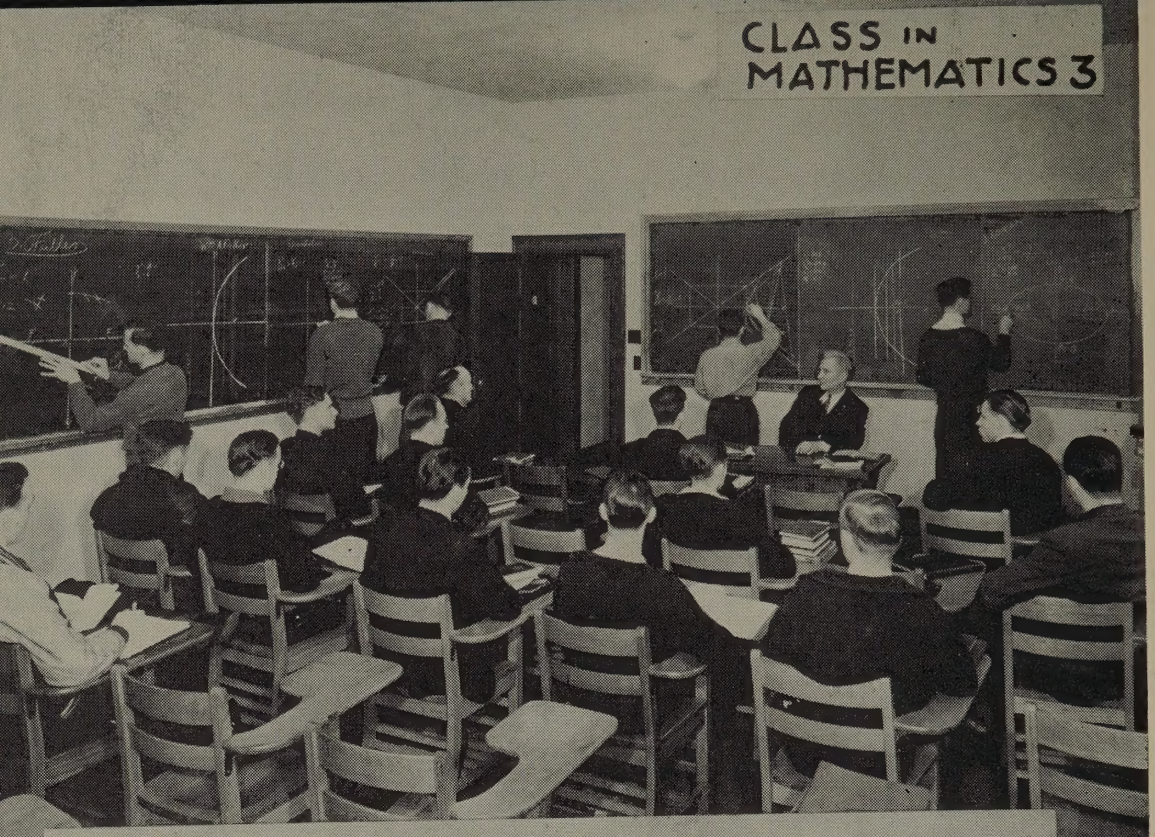
Aeronautical Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Mechanical Engineering
Radio Engineering

AND

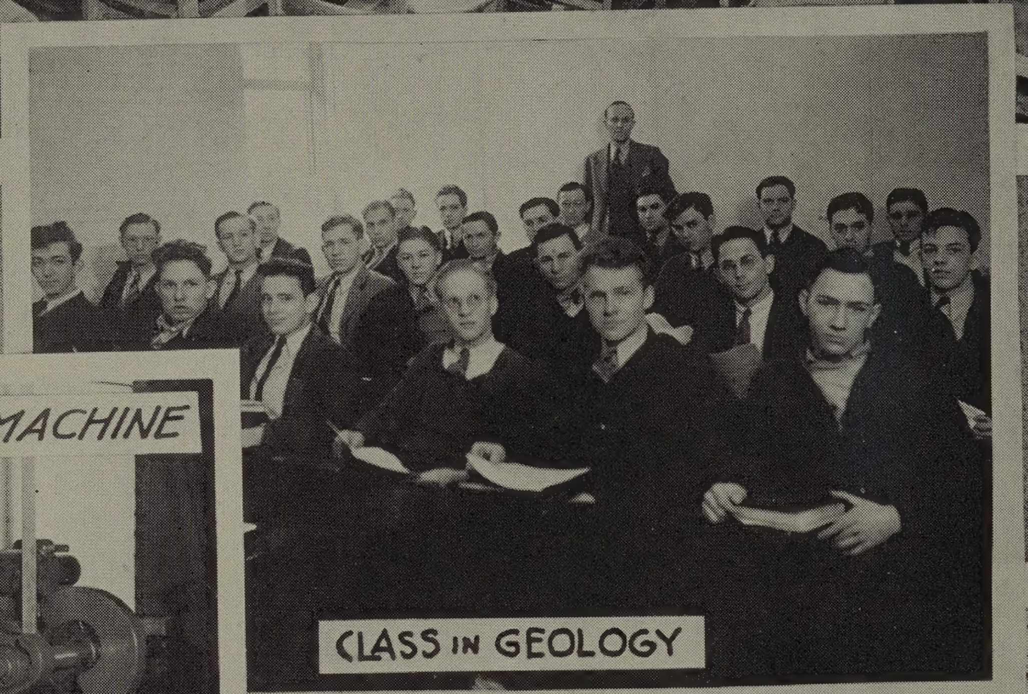
Vocational Courses in Radio and in Mechanical Drafting

See Page 5 for School Calendar

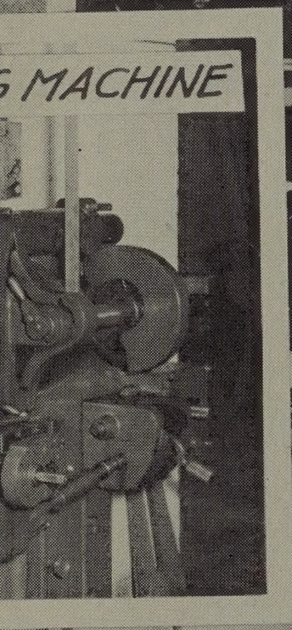
221-223-225 E. Washington Blvd.
Opposite Y. M. C. A.
FORT WAYNE, INDIANA



CLASS IN MATHEMATICS 3



CLASS IN GEOLOGY



S MACHINE

MACHINE SHOP

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Origin and Ideals

In 1930, John A. Kalbfleisch, former school executive and director, and William J. Hess, of extensive financial and manufacturing experience, with consulting engineers and educators, organized Indiana Technical College.

Among the many technical and mechanical industries of Fort Wayne there had long been a growing demand for capable technical men and engineers. This demand called for men with thoroughly practical, yet sound scientific and engineering education and training.

It seemed that the way to meet the demand was to focus the entire educational effort of a well-equipped, well-organized and efficiently managed school on the technical subject-matter and knowledge which the young engineer needs to have fresh in mind, first and last, not only to secure and hold a position, but also to win a commanding position in his profession.

Therefore, it was decided that the educational policy and ideal of Indiana Technical College should be one of strong concentration on mathematics, science, and engineering subjects. It was held to be sound policy, entirely in harmony with a fast-growing age demanding RESULTS, to stick to one kind of learning instead of dividing the student's attention by asking him to study also at the same time the many non-technical subjects generally interwoven into the conventional engineering program.

Consequently all of the non-technical subjects, except practical and useful English, modern economics, and business and engineering applications of law, were omitted. It was also realized that an intense, practical and thorough program of technical subjects would appeal strongly to the man with an engineering bent of mind, but consequently with little or no leaning to the so-called liberal arts content of education.

Finally, Indiana Technical College frankly had in mind the ambitious and capable young man who lacked the $700 to $1200 per academic year to see him through a four-year program of education. It seeks to make it possible for this deserving young man to get by, if necessary, on an amount from $350 to $450 for the school year of TWELVE MONTHS and so to realize his right to enter the engineering profession along with his brother who happened to be born in more fortunate circumstances.

Following is an excerpt from a letter touching on this very point, from Chauncey R. McAnlis, City Engineer of Fort Wayne, and former instructor in engineering subjects in the University of Illinois and at Cornell:

> Your plan of covering the technical requirements in 24 months by omitting many of the non-technical subjects has been of great interest to me and should interest these days most young men who want to be up and doing.
>
> Furthermore, you open a fine opportunity to the young man who must save time and money. He can come to your school, and by earning some of his personal expenses, as is possible in a city like Fort Wayne, he can secure a professional training as well as

his more fortunate brother, who, though he has plenty of money behind him, may never learn the lesson of self-reliance which is such a necessary qualification in making good.

INDIANA TECH students have a decided advantage over those who attend schools in small towns. In a technical and industrial center like Fort Wayne, they can make many inspection trips and see exactly what will be required of them later after they have graduated and are ready for work.

Status of Indiana Technical College

Indiana Technical College is incorporated under the laws of the State of Indiana, and so is authorized to conduct courses in technical and engineering education as outlined and described in this catalog. Like any other successful business, it exists by giving satisfactory service to its patrons. It has no connection with any other school. As to its standing and financial responsibility, Indiana Technical College refers prospective students to any bank in Fort Wayne, the Chamber of Commerce, the city officials, ministers, the Y. M. C. A., the Community Center, the Superintendent of Schools, and to the heads of the city's commercial and manufacturing concerns.

Progress

That the policies and principles underlying the Indiana Technical College system of training and education for the engineering field are correctly planned and related, is verified by the judgment of the increasing number of students who are choosing TECH as their alma mater. Although many students are forced to attend terms alternately with time taken out to earn tuition, the fact that they return to their studies shows that they appreciate the treatment received at Indiana Technical College.

Personnel Department

Employers show a ready courtesy to TECH graduates, for they are making good under the requirements of state, institutional, and industrial service.

In order to acquaint employers with the special abilities and qualifications of graduates, a PERSONNEL Department has been organized. It is most strongly to a student's advantage to make a record in his studies such that there may be no hesitancy on the part of the Department in recommending him whole-heartedly and enthusiastically. After all, the extent of the service which this Department is able to render to the student is measured by the reputation and record he has made.

Every graduate of Indiana Technical College is automatically entitled to permanent registration with the Personnel Department which maintains a complete record of his ability as shown by his grades, of his general conduct, and of his impressions on his instructors and on his fellow students. It is also desirable that the student furnish information about his experience before entering the college, so that favorable points from it may be recorded and used in his favor in reporting his personal record to prospective employers upon his graduation.

Many Opportunities in Fort Wayne for Students' Inspection Trips

International Harvester's truck manufacturing division, the great midwestern plant of the General Electric, specializing in small motors, electric meters, transformers, radios, refrigerators and air-conditioning equipment; Bowser, Wayne Tank and Tokheim plants pioneering in gas and oil tanks, filling-station equipment, water softeners and oil burners; Magnavox and Inca loud speakers and radio sundries; Bass car-wheels, castings, grey iron tanks and forgings; American steel dredges, oil barges and sectional steel hulls are industrial terms constantly heard in Fort Wayne.

Students go on frequent inspection study trips to the outstanding industries to see first hand the industrial application of mechanical, electrical, and chemical principles. TECH students are welcome and their visits are made interesting and profitable. The widely diversified industries of Fort Wayne offer splendid employment opportunites to Tech graduates. Indiana Service Corp., Tokheim, General Electric, Hoosier Paint Co., and Magnavox are among employers of Tech graduates.

Here is a partial list of Fort Wayne products:

Agricultural machinery
Air pumps
Batteries and plates
Belting
Beverages
Boilers
Brass foundry products
Brick
Carwheels
Castings
Chemists' supplies
Coal stokers
Concentrating tables
Clothing
Cooperage
Dredges
Electrical
  appliances
  generators
  meters
  motors
  refrigerators
  transformers
Engineering supplies
Feed
Fertilizer
Fishing tackle
Foundry products
Forgings
Furniture
Fuel oil
Hosiery
Gas manufacturing machinery
Hoisting and lifting machinery
Jewelry
Lamp bulbs
Machinists' tools
Mattresses
Mosaics
Oil Burners
Paints
Paperboard
Paper products
Patterns
Petroleum products
Public address systems
Roadbuilding machinery
Radios
Sewer pipe
Steel dump bodies
Structural steel
Sugar
Tanks
Tile
Trucks
Varnishes
Water softeners
Washers and ironers

In addition to its many technical and industrial activities Fort Wayne is a most refined, modern and beautiful city in which to live. The population is 135,000, and the city has:

725 Acres of Parks	21 Theaters	7 Banks
77 Churches	82 Fraternal orders	5 Railroads
26 Public Schools	14 Commercial clubs	2 Airports
26 Parochial Schools	11 Libraries	2 Broadcast stations

Library and Reference Advantages

The Public Library of Fort Wayne and Allen County, corner of Webster and Wayne Streets, four blocks from the College, houses over 220,000 volumes of catalogued books, over 7,000 other books, and 2,200 volumes of bound magazines. Like the General Sections, the Business and Technical Section is equipped with comfortable reading rooms. It has over 8,000 volumes catalogued, and over 200 current technical and business magazines on file.

The library is a designated Depository Library of the Federal Government and receives Federal Publications as printed and distributed by the Superintendent of Documents of the United States Government Printing Office.

This advantage is valuable to the student who wishes to investigate a subject of research in the light of the latest information and development.

General Information

SESSIONS

Sessions are held the year around. Four terms of TWELVE WEEKS each make up the academic year, leaving approximately one week's leisure at the end of each term. Students may attend the year around or alternate terms, as most convenient. The customary holidays are observed. Opening and closing dates of terms are listed on the following calendar:

Fall: September 1—November 23, 1938

Winter: November 28, 1938—March 1, 1939
Christmas Vacation: December 23, 1938—January 3, 1939

Spring: March 6—May 26, 1939

Summer: June 1—August 23, 1939

Fall: September 5—November 24, 1939

CLASS PERIODS AND CREDIT HOURS

Terms are 12 weeks long. There are no classes on Saturday. The daily schedule runs from 7:55 A.M. to 5:15 P.M. with 70 minutes for the luncheon hour. The schedule is divided into 50-minute periods. Usually a student will have classes and laboratory periods during one-third to one-half the daily schedule. He may study in the college lecture or study rooms, at the Y reading room across the street, or at his room.

In a subject like Mathematics I (College Algebra) the class meets five times a week, therefore the credit is 5 term hours toward graduation. In a subject like Engineering Drawing I the student spends three 50-minute periods in the drawing room for each credit hour. It is the general rule that three periods of laboratory or drawing room work are the equivalent of one period of class work plus outside preparation.

ENTRANCE (Important)

Admission should be arranged for well before the opening date of the term. In order that the necessary preparations for the reception of the student may be made for his first term, including selecting and reserving suitable rooms; ordering textbooks well in advance, so that no delay may occur; and the planning of part-time work when necessary; it stands to reason that the officials of the College deserve sufficient advance notice to have a fair chance to make good with the student.

ADMISSION

By presenting entrance credentials, paying tuition and laboratory fees, determining class schedules of subjects, enrollment in classes, and procuring textbooks, admission is completed.

ENTRANCE REQUIREMENTS

Graduation from a standard four-year high-school course is recommended, the student having earned thirty-two credits or sixteen units. To stick too blindly, however, to such a requirement might deprive some fine and substantial young man of the free right to serve in his chosen profession.

From the College's past experience with several carefully observed examples, it is evident that there are young men who, unfortunately or otherwise, were deprived of a complete high school education, but, nevertheless, because of maturity and practical experience, may become most able and loyal students and successful technical men and engineers. To penalize such men for lack of early opportunity to go to school would be manifestly unjust. They will receive cooperation and encouragement at Indiana Tech.

SCHOLASTIC STANDING

Students who lack technical entrance credits, lack full scholastic standing until such deficiencies are removed. The same is true of any student in advanced subjects while a failure or a condition remains on his record.

PREPARATORY DEPARTMENT

Classes in preparatory mathematics and science are in constant session in this Department. Due to delayed choice of fitting subjects in high school, or because of high schools not offering all required prerequisites for an engineering education, the high-school graduate is not always prepared to take up every subject in the freshman term of his engineering course. Inasmuch as algebra is usually given in the freshman and junior years of high school, the student often loses some of his facility in algebraic processes, and can profit very greatly from a review.

The student who has not completed high school, but who has, through maturity and experience, acquired a certain firmness of purpose, can readily make up credits in the Preparatory Department. Often such make-up work or review can be absorbed without loss of time in the long run in the student's course.

NO EXTRA CHARGES FOR PREP OR REVIEW WORK

It was an original principle with Indiana Tech that every student should be encouraged to be THOROUGH in his studies. Therefore, no added charge is made for a reasonable amount of preparatory or review work. Should a student require nine instead of the customary eight terms to earn his degree, the tuition charge would still be restricted to eight terms.

ADVANCED STANDING

Upon the presentation of a satisfactory statement of credits and marks from a reputable school, in subjects duplicating any contained in the course contemplated by the prospective student, advanced standing is granted.

ATTENDANCE

Regular and prompt attendance, thorough lesson preparation, constructive and alert classroom attitude, and gentlemanly conduct are expected. It is not felt that very much of the time of the Instructors is to be spent in admonishing students as to their studies.

The recommendation of the College is rapidly increasing in value as its graduates make reputations for professional ability and conduct. It is desired that every student set himself an ideal to earn the sincere and unqualified endorsement of the Personnel and Employment Department for punctuality and reliability.

Absences are permissible for legitimate participation and extra-curricular activities, or in field and inspection trips under supervision of the Faculty. Unless such absences are arranged for by previous authorized sanction, special arrangements must be made in advance of the intended absence.

The faculty reserves the privilege to require extra credit hours from students whose attendance is faulty to the extent of preventing their doing creditable work.

EXAMINATIONS AND GRADES

Failure to earn a passing grade requires review or retaking of the course at the discretion of the instructor. Grades given range from "A" for superior work, to "B" for very satisfactory work, to "C" for good work, to "D" for passing, and "F" for failure. Final examinations are required in all subjects. Indiana Tech favors no plan by which the student is deprived of the benefit of a sound understanding of every subject, such as is stimulated by a comprehensive examination.

One transcript of credit is furnished to graduates without charge; additional copies, $1 each.

TUITION

Tuition is $60 per term, and is unconditionally payable upon admission. Special discounts are in effect for the payment of more than one term's tuition at the same time. At the discretion of the instructor, one review of any subject is given without charge, except for laboratory fees. A second review may be charged for at the regular credit hour rate.

TRANSFER OR REFUND OF TUITION

Unused tuition may be transferred to one not already an enrolled student. A student who is permanently incapacitated from attending school because of illness will receive a refund of 80% of the pro rata remaining paid-up tuition. Registration fee to the amount of $10 is not subject to refund.

LABORATORY FEES

Laboratory fees are based on the bare minimum of ordinarily used materials at cost price. Students are entirely responsible for laboratory apparatus as well as for other school property used by them. A One Dollar breakage fee deposit is required in some courses, subject, however, to refund of the amount remaining in excess of actual damage.

General lab fees, however, are not subject to refund.

TEXTBOOK AND SUPPLIES

The best of the standard texts in their fields, according to the judgment of the Faculty, are chosen from time to time. Under Description of Courses, page 32, the names of the texts and their authors are included with the outlines of college subjects. Books and supplies are obtainable at the College Book Store at list prices. Terms are CASH.

The Book Store does not seek to deal in used books, and cannot take orders to reserve them, but sometimes has them on hand at bargain prices. Ordinarily the demand for used books greatly exceeds the supply. Consequently a student will have ample opportunity to sell his own books, if he wants to.

Students estimate that they have reclaimed 50% to 60% of the cost of books throughout their courses by selling their used books.

An approved drawing outfit is obtainable at the Fort Wayne Blueprint & Supply Company for $9.50.

ROOMS AND BOARD

Approved private homes offering rooms at from $1.50 to $2.50 per week abound within five to fifteen minutes' walk of the College. Prices vary somewhat with supply and demand, but early registration will assure the student of securing almost exactly what he wants.

Table board varies in price within the student's taste and purse, but has been secured as low at $5 per week. Board, room and laundry have been obtained at $7 per week.

Y. M. C. A. AND CATHOLIC COMMUNITY CENTER

The Y is opposite the College, and the Community Center is one block south. Rates run from $2.50 up at the Y, and from $4.00 up at the Center.

The Y rate is a special concession to Tech students, and also includes the privilege of reading rooms, gym, swimming pool, showers, volley and net ball, and supervised athletics. Both the Y and the Center serve wholesome food at unusually reasonable prices.

PART-TIME WORK

Most Tech students, sometimes as many as 80%, earn board. After they have been here long enough to get well settled into their studies and to get acquainted in the city, some earn nearly all of their personal expenses.

Such matters are entirely up to the student's ability, personality and industry. Quite naturally, the student's classroom load must be adjusted according to the amount of outside work he wants to do.

STUDENT WELFARE DIRECTOR

The Student Welfare Director assists students in finding board, room, and part-time work.

Usually he is able to place all beginning students within a reasonable time after their arrival, if not at once. Obviously it is an advantage to enroll early enough so that the student's arrival may be definitely anticipated in the Welfare Director's plans.

However, unless he has made special protective arrangements with the President, any student should come prepared to take care of his personal expenses for 30 days as a simple common sense measure.

CONVOCATION

Students assemble for Convocation every two weeks. Programs vary. Frequently there are addresses on technical and industrial subjects. Prominent engineers passing through Fort Wayne are available for addresses.

Dr. Saul Dushman, Assistant Director, G. E. Experimental Laboratories, Schenectady; Dr. John J. Caton, Educational Director, Chrysler Corporation, Detroit; Lt. Wm. Potts, Detroit Police Department, inventor of the traffic light and originator of the police radio system; Dr. James S. Thomas, President, Chrysler Institute of Engineering, Detroit; and R. N. Harmon, Chief Engineer, Radio Division, Westinghouse Electrical & Manufacturing Co., have addressed Tech Convocations.

CHURCH ATTENDANCE

The college expects its students to affiliate themselves with one of the numerous downtown churches. The student who has been used to attending church at home should not discontinue his devotion because he is in another city.

MUSIC

Students are aided and encouraged to organize quartets, glee clubs, choruses or orchestras, depending upon the amount of talent available.

TECHNICIAN

The TECHNICIAN, the official school paper, is published by the Technician staff under the supervision of the student council.

ATHLETICS

Opportunity exists for participation in competitive athletics in leagues fostered by the college, the Y. M. C. A., and the Community Center in basketball, soft-ball and water polo. The college "letter" is awarded for special merit in these sports.

STUDENT COUNCIL

The Student Council is the general representative organization of the student body. Through ample representation from each department, it exercises advisory control of all student activities from functions in connection with the faculty for the general welfare of the college.

FRATERNITIES

Beta Chapter of the national fraternity Alpha Gamma Upsilon was transferred to Indiana Technical College April 16, 1932. Pledges are eligible for initiation after one term's attendance.

TECH BRANCH FORT WAYNE SECTION A. I. E. E.

Tech students who have completed sixty hours of college work, including fifteen hours of Electrical Engineering, are eligible for membership. Extensive programs of interest to students are furthered by this organization.

X. E. T.

The membership is composed of men with a deep interest in chemical engineering who wish to preserve a fraternal relationship in and out of college.

MECHANICAL CLUB

This organization is for students of the Mechanical Engineering Department. Its ideals are both scholastic and social. Programs frequently include talks by experienced engineers.

AERONAUTICAL SOCIETY

This organization is composed of students of the Aeronautical Engineering Department with the general purpose of broadening their knowledge in their field, particularly by personal contact with the industry.

FLYING CLUB

Membership is open to any Tech student who is interested in flight training or instruction at local airports.

CIVIL ENGINEERING SOCIETY

Membership is open to students of the Civil Engineering Department who have satisfactorily completed one term's work. The purpose of this organization is the study of problems in the civil engineering field.

TECH WIRELESS ASSOCIATION

Membership composed of students of the Radio Engineering Department who are especially interested in amateur activity—transmission, reception, experimentation and fellowship.

ANNUAL EXHIBIT

The Tech Annual Exhibit is held in May of each year and attracts large crowds of visitors. Suitable awards are offered for best departmental and individual displays.

AWARDS AND TROPHIES

Kalbfleisch Memorial Scholarship is provided by Mrs. J. A. Kalbfleisch in memory of the late J. A. Kalbfleisch, first President of Indiana Technical College; awarded to a student of excellent character who gives promise of outstanding professional ability. The award is made by Mrs. Kalbfleisch, Dr. Paul H. Krauss, Pastor, Trinity English Lutheran Church, and President A. T. Keene.

The Hess Award for departmental excellence in annual exhibits is presented by William J. Hess, Chairman, Board of Directors.

The Caswell Trophy for excellence in Engineering Drawing is presented by William Henry Caswell, Detroit, Michigan.

Alpha Gamma Upsilon Fraternity offers a cash award each term to the student with highest scholarship, and further honors such student by engraving his name on the Fraternity Honor Plaque.

Letters, keys, medals and pins are awarded to students for meritorious service in school activities.

REPORTS ON STUDENTS' PROGRESS

Reports are made to parents and guardians of the grades for each term's work. When requested, or when it seems to the immediate best interests of all concerned, special reports are made after midterm examinations.

The Faculty earnestly solicits the cooperation of parents and guardians as to best promoting the student's progress.

REVISIONS AND CHANGES

The right is reserved to make such changes as are advisable in the provisions of this catalog.

Requirements for Bachelor of Science Degree

1. The candidate must be of good character and reputation.
2. He must have earned the required number of term hours of credit and be in full scholastic standing.
3. He must have earned required grades in special and major subjects.
4. All obligations due the college must be paid.

Bachelor of Science Degree Courses

The courses in Electrical, Civil, Chemical, Radio and Television, Aeronautical, and Mechanical Engineering compare favorably in technical hourage with those offered in four-year schools.

All contain the standard program of six terms of mathematics, from College Algebra to advanced Calculus, using standard college textbooks. Likewise all courses include the three standard terms of Engineering Drawing, using French's ENGINEERING DRAWING, a standard college and university textbook.

The general sciences of chemistry and physics round out the basic foundation of all courses, except in the vocational Radio Courses in which Code 1, 2, and 3, are pursued intensively. The courses in code will help the student to qualify for the Federal Communications Commission operators' license examinations. Those particularly interested should write for the pamphlet, "Rules Governing Operator Licenses," addressing the Commission at Washington, D. C.

The two terms of College English seek to give the student a clear and correct command of general and technical writing and speech. The textbook is A HANDBOOK OF ENGLISH IN ENGINEERING USAGE, with supplementary exercises stressing actual English usage for engineers. The studies in Economics and of the applications of Law to contracts and other legal responsibilities peculiar to engineering and business relationships are planned to give the engineer the practical viewpoint of the legal and business sides of his profession.

The remaining subjects in each course relate to the requirements of each special field. For instance, the Civil Engineer becomes familiar with surveying; the computation of stresses and strains, and of the strength of materials; the uses of concrete; the problems of highway, municipal, sanitary, hydraulic, structural, and railway engineering; the field of bridge design, etc. On the other hand, the Electrical Engineer studies direct and alternating, and polyphase currents; electrical generator units and power stations, electrical machine design, a summary of electrical measurements; and the field of industrial applications and its requirements.

Vocational Diploma Courses

The man who cannot, for the present, see his way clear to devoting two years to an engineering and technical training, may find what he wants in the Mechanical Drafting course, outlined on page 28, or he may take four terms of the Radio Engineering course for the Diploma in Radio Operation and Code.

Most of the subject-matter contained in the Drafting course commands college credit and may be utilized later toward earning the B.S. degree, as well as qualifying for fine positions in Drafting for the present.

Aeronautical Engineering

Aeronautical Engineering has assumed a definitely important place in present-day manufacturing, transportation, and communication. The course offered at Indiana Technical College makes possible a career in design and production of heavier-than-air machines, the development of airports, aircraft operation, and the administration of airways.

Aeronautical subjects proper are attempted only after the student is well-grounded in the fundamentals of mathematics, engineering drawing and general science. This sequence of subjects carries the student logically and smoothly upward through general engineering requisites into aeronautical problems.

The course offers a broad scope of fifty-eight term hours in aeronautical engineering subjects—Aeronautical Engineering, Aerodynamics, Internal Combustion Engines, Airplane Design, Stress Analysis, Propeller Design, Meterology and Avigation and Aerostatics—a specialization equalled in few courses in this field. Students cover not only the various phases of the field, but also complete individually accurate calculations and tests on airplane performance and stability. They learn the various types of designs and carry through a complete design and stress analysis of a plane, including propellers and limited details according to the specifications of the U. S. Department of Commerce and other governmental authorities.

A Swiftly Developing Field

Development of aircraft in recent years has been amazing. Passenger traffic increased from 461,743 persons carried in 1934 to 1,217,571 in 1937. The demand for men capable of designing and inspecting aircraft production is potentially unlimited. The well-trained Aeronautical Engineer may specialize in propeller design, airplane design, airplane production, airplane stress analysis, airport management, traffic management, and executive duties. The recent adoption by automotive manufacturers of streamline design emphasizes the importance of the study of air currents and forces disclosed in wind-tunnel laboratory experiments.

No more alluring field than that of Aeronautical Engineering is opening up before the man who is ambitious and who seeks broad and interesting opportunities.

The course does not include flying instructions. Training in flight is advisable in the advanced terms of the course for those who are interested. Such instruction is available at the local airports from licensed pilots at very reasonable rates.

Note on page 15 that the Aeronautical Engineering course has been expanded to include nine terms or 27 months for completion.

LABORATORY EQUIPMENT AND EXPERIMENTATION

Practical integration of the course is effected by laboratory work in the technic of the various phases of testing airplane design. Wind-tunnel tests determine full scale performance of stability, maneuverability, and desirability of new planes before construction is ever attempted. Tests include the following:

Investigation of the airflow about a cylinder, streamline strut and airfoil section;

Calibration of an inclined tube manometer and its application with a Pitot-static tube;

Investigation of the sensitivity of a Pitot-static tube to misalignment in yaw, for angles up to 25 degrees;

Pressure distribution along the rib of a standard wing section, with and without a trailing edge flap at various angles;

Aerodynamic characteristics of a modern wing, with and without trailing edge flap;

Aerodynamic characteristics of a complete airplane model;

Investigation of the resistance of a radial aircooled engine;

Investigation of parasite drag;

Measuring the angle of downwash behind a wing;

Investigation of the rolling and yawing moments of an airplane;

Longitudinal stability characteristics of an airplane;

Hot wire anemometer;

Determination of overall wind-tunnel efficiency;

Calculation of the performance of a full-scale airplane from data obtained from wind-tunnel tests of a model; and

Calibration of a channel gauge in connection with the wind tunnel.

The new wind-tunnel was designed for complete classroom instruction as well as for commercial testing. The plans were carefully studied by a former member of the National Advisory Committee for Aeronautics, and his revisions and suggestions were adopted. The tunnel is of the modern return-flow, atmospheric type with semi-elliptical air passage.

Overall dimensions are 33½′ x 18½′, the axes of the test section being 3′10″ and 2′8″ respectively. A 60 h.p. generator-D.C. motor combination driving a 7-foot propeller is designed to furnish air-speeds well over 100 m.p.h. The three-balance arm, wire suspension type of balance for holding models is most suitable for accuracy and instruction purposes.

A modern high-power radial aircraft engine and conventional V-type engines, a complete set of cut away engine parts, instruments, and a complete plane are available for study and inspection. Excellent facilities for airport inspection and traffic study are open at Fort Wayne's two airports.

All available reports on past and current experimentation from the National Advisory Committee for Aeronautics, the U. S. Department of Commerce, including reports from foreign governments, are on file.

COURSE IN AERONAUTICAL ENGINEERING

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

M	2	Trigonometry	5
Engl	2	English II	5
Ch	2	General Chemistry II	5
Ch	2A	Gen. Chem. Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

M	3	Analytic Geometry	5
Ph	1	Physics I	5
AeE	1	Principles of Aeronautics	3
ED	3	Engineering Drawing III	2
Law	1	Engineering Law	5
			20

Term IV

M	4	Differential Calculus	5
Ph	2	Physics II	5
ED	10	Descriptive Geometry	3
AeE	2	Aerodynamics I	5
AeE	2A	Aerodynamics Lab. 1A	2
			20

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
AM	1	Applied Mechanics I	5
AeE	6	Meteorology and Avigation	3
AeE	3	Aerodynamics II	5
AeE	3A	Aerodynamics Lab. 2A	2
			20

Term VI

M	6	Calculus	5
SM	1	Strength of Materials I	5
AeE	20	Aircraft Radio	2
AeE	4	Aerodynamics III	5
AeE	4A	Aerodynamics Lab. 3A	2
			19

Term VII

EE	10	Electrical Engineering	5
SM	2	Strength of Materials II	5
ME	21	Thermodynamics	5
AM	2	Applied Mechanics	5
			20

Term VIII

ME	30	Internal Combustion Engines	5
ME	10	Mechanism	5
AeE	8	Airplane Design I	5
AeE	8A	Airplane Design Lab. 1A	5
			20

Term IX

Cat.	No	Subject	Cr. Hrs.
AeE	9	Airplane Design II	5
AeE	9A	Airplane Design Lab. 2A	5
AeE	7	Propeller Design	5
AeE	7A	Propeller Design Lab.	2
AeE	10	Aerostatics	2
			19

Nine-term Course (27 Months)—176 Credit Hours

The Field of Chemical Engineering

The course in Chemical Engineering includes the usual thorough grounding in mathematics, physics and chemistry, in addition to carefully selected subjects in the fields of civil, electrical and mechanical engineering.

Because the applications of chemistry are so numerous and diversified, even the most casual examination will reveal the fact that virtually all industries in some stage of processing, development, or manufacturing, must depend directly upon men with a knowledge of Chemistry. This has given rise to specialization in the field of Chemical Engineering, so that there are today highly specialized and diversified fields, such as Metallurgical Engineering, Gas Engineering, Petroleum Engineering, Ceramics Engineering, and various others. However, all of these fields are nothing more than offshoots from the parent, Chemical Engineering, which, therefore, still retains its major importance.

The Chemical Engineer is likely to find himself in most any industry requiring a knowledge of chemistry, but he may also be required to carry a project through any of its major stages of development. He is likely to have to determine the correctness of the scientific principles underlying some proposed process through actual laboratory experimentation. This requires that he have a thorough knowledge of the basic principles of chemistry.

Having verified the correctness of the scientific principles involved, he may be required to determine the most suitable operating conditions. Here again a sound technical foundation is essential.

Or, the problem may be one of designing a suitable plant, which in turn requires a knowledge of engineering materials, and of their practical aspect of design. Again, he may be called upon to solve the numerous problems involved in the operation of a commercial plant, in which case the chemical engineer may be the superintendent, or a departmental technical executive.

These facts are further illustrated by an examination of positions held by recent graduates, which reveals them to be employed in such highly diversified industries as paint manufacture, air conditioning, rubber manufacture, petroleum technology and metallurgy.

Realizing the importance of chemistry to the Chemical Engineer, General Chemistry I is approached from the quantitative, mathematical, and theoretical point of view, rather than from the descriptive point of view usually emphasized. Since the Chemical Engineer here meets for the first time those basic principles which weave their way all through chemistry and chemical engineering, regardless of how far advanced it may be, great care is exercised to ground him firmly and correctly in these principles.

Although this careful guidance from the first term on is never relaxed, as the student progresses he is encouraged more and more to think and work out problems for himself. Consequently, he gains confidence in himself, and is gradually, yet surely, brought face to face with the very type of

problems he is likely to meet later in actual practice. Special opportunity is provided by options for students desiring to specialize along certain definite chemical engineering lines.

The selected option is then the outgrowth of the realization of the need of industry for men who possess not only a broad general background, but also some specialized training. Since many students desire specialized training, this demand has given rise to several one-term laboratory courses in chemistry of a specialized nature. In these laboratory courses, the student is given an opportunity to perform and observe for himself the various processes discussed in the classroom.

Laboratory Development

The laboratories contain complete and ample equipment and lockers stocked with basic apparatus. There are mechanical crushers and pulverizers, an electric oven, muffle and crucible furnaces, fume hood, oxygen bomb calorimeter, and five sets of scales, one of which for tests in assaying and metallurgy is accurate to .00001 grams. The equipment is constantly being replenished and added to. There is ample accommodation for performing complex experiments without interference, and opportunity for special experimentation and analysis on problems and products submitted to the laboratory.

Chemistry Laboratory 1A correlates the classroom theory by actual experiments performed and observations made. Chemical reactions are studied from a cause and effect relationship.

Qualitative Analysis includes qualitative determination of the more common elements according to the method used by Long, Anderson and Hazelhurst.

Quantitative Analysis includes gravimetric and volumetric analysis, with options offered in the analysis of iron and steel, oils, fats and waxes, and food analysis.

Organic Laboratory includes work in the identification of compounds in the synthesis of typical compounds. Many are actually prepared in the laboratory, of which the following are representative:

ethyl ether	**acetamide**	**p-dibromo benzene**
dibromo-ethylene	**flourescein**	**anilin**
nitro-benzene	**eosin**	**acetyl chloride**
sodium benzenesulfonate	**iodoform**	**butyl and amyl**
bromo benzene	**acetanilide**	**acetate**

The industries of Fort Wayne offer a fertile and diversified field for inspection trips. The relation of chemistry to electrical, refrigerating and air-conditioning manufacturing processes are observable within easy access of the College. Sugar refining, water purification and softening, metal fabrication, processing and preserving foodstuffs, the making of oil products, fuel gas, paints and varnishes, and beverages are of interest to Indiana Tech students of Chemical Engineering.

COURSE IN CHEMICAL ENGINEERING

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
Engl	2	English II	5
Ch	2	General Chemistry II	5
Ch	2A	Gen. Chem. Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
M	3	Analytic Geometry	5
Ph	1	Physics I	5
ME	20	Engines and Boilers	5
ED	10	Descriptive Geometry	3
Ch	3A	Qualitative Analysis	2
			20

Term IV

Cat.	No.	Subject	Cr. Hrs.
M	4	Differential Calculus	5
Ph	2	Physics II	5
Ch	4A	Quantitative Analysis 4A	2
Ch	6	Organic Chemistry I	5
Ch	6A	Organic Chem. Lab. 1 A	2
			19
ED	3	Engineering Drawing III (Optional)	2

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
AM	1	Applied Mechanics I	5
Ch	5A	Quantitative Analysis 5A	2
Ch	7	Organic Chemistry II	5
Ch	7A	Organic Chemistry 2A	2
			19

Term VI

Cat.	No.	Subject	Cr. Hrs.
M	6	Calculus	5
AM	2	Applied Mechanics II	5
EE	10	Electrical Engineering X	5
Ch	8	Physical Chemistry I	5
			20

Term VII

Cat.	No.	Subject	Cr. Hrs.
Ch	9	Physical Chemistry II	5
ChE	1	Chemical Engineering I	5
ME	21	Thermodynamics	5
or			
CE	12	Hydraulics	
SM	1	Strength of Materials	5
			20

Term VIII

Cat.	No.	Subject	Cr. Hrs.
Ch	9A	Physical Chem. Lab. 1A	2
ChE	2	Chemical Engineering II	5
ChE	3	Chemical Engineering III	5
Law	1	Engineering Law	5
or			
Ec	1	Economics I	
*Ch	101A	Applied Analysis	2
ChE	4A	Chemical Engineering—Plant Design	2
			21

*An approved subject of special interest may be substituted.

Two-year Course (24 Months)—157 Term Hours.

The Field of Civil Engineering

Civil Engineering is the oldest of the engineering professions, and may well be considered the parent of most of the other more or less specialized phases of Engineering Science. Egypt's pyramids; the Roman roads, bridges, and aqueducts; the channeling and dyke-building along China's Yellow River; are monuments to Civil Engineers who, thousands of years ago, pitted their skill against adverse Nature, overcoming her obstacles or holding in check her tremendous forces. Even as today the Civil Engineer builds our roads, so through the centuries, the profession of Civil Engineering prepared the figurative roads along which other branches of engineering have advanced.

In the light of modern progress, the Civil Engineer is even more notably indispensable than in the past. The construction of the radio station, the chemical works, the steel mill, the factory, the hydroelectric plant, is first made possible through the ability of the Civil Engineer in applying to special and individual requirements the skill and knowledge of his profession.

The Civil Engineer provides the means for commerce and intercourse between cities and nations. He builds railroads and highways, bridges and tunnels; he improves and deepens harbors and channels for ship traffic; and he constructs the shipyards where the far-plying vessels are built. His hangars, landing fields, and beacons are making travel in the air as safe and sure as travel on the ground, aiding materially in maintaining the definite and certain schedules which characterize America's airway commerce.

The Civil Engineer's reservoirs and filtration plants provide wholesome water for teeming cities; his irrigation projects transform deserts into farms; his sanitation systems banish fevers and plagues; and his factories and skyscrapers provide homes and work-places for millions of people.

Levees, dykes, channeling, and stream-redirection, each year materially diminish economic flood loss, while performing the more vital service of minimizing, in flood areas, the danger to life that has always existed. The Civil Engineer determines the boundaries of state and nation; his surveys are the bases of property rights in city, town and country, and all our maps are made by him. Without the Civil Engineer, the development of our civilization would have been impossible. He has been vitally necessary to progress since the dawn of history, and the complex structure of modern life makes greater demands upon him than have ever been made before. The past has always been dependent upon the Civil Engineer; the future must be so to an even greater degree.

Many projects, national in character, promise constantly increasing demand for graduates in Civil Engineering. Among them are nation-wide projects for electrification as typified by TVA; extended plans for flood control, especially in view of the disastrous Ohio Valley flood; the reconstruction of national highways to accommodate rapidly increasing and faster traffic, and projects for overcoming dust storms and soil erosion by reforestation and other means.

Civil Engineering Laboratory

The Civil Engineering course at Indiana Tech includes intensive practical laboratory work with modern field and testing equipment. In the Surveying courses all students are required to make complete and accurate surveys of assigned terrain areas, and to acquire facility in the use of all items of the surveyor's equipment under actual field conditions. Our six transits and levels are the product of world-famed manufacturers—namely: Berger, Keuffel and Esser, Gurley, and Dietzgen. These makes are acknowledged in engineering circles as among the finest obtainable. The student is thus assured of proper training in the use and care of exactly the same type and grade of instrument that he will be required to use in the most precise professional work.

The latest Keuffel and Esser level rods, with micrometer vernier targets, are used in the stadia-surveying practice work, and a thorough grounding is given in the applications of this valuable principle in distance calculations and checking. Chicago and Lufkin chains, designed for work of extreme accuracy, are employed. Our chains are of the type approved by the U. S. Bureau of Standards, carrying compensating scales to balance the expansion and contraction resulting from temperature changes. Sighting poles, pins, etc., conform with the highest professional standards.

An important adjunct to class work in the Concrete Design and Highway Engineering Course is the experimental mixing, curing and testing done in the Materials Testing Laboratory. Machines and equipment manufactured by the Tinius Olsen Company are used for tensile, compressive, and penetration tests on concrete specimens, as representative of the best obtainable for this purpose.

The function of laboratory work is to provide the student with the personal experience in the practical phases of his work which obviously cannot be obtained from classroom lectures and discussions. All such work at Indiana Tech is under the direction and supervision of experienced and competent men, hence, our laboratory successfully fulfills its purpose, and the gratifying success of our graduates in the professional field is ample proof that it does.

There is abundant opportunity in the City of Fort Wayne in the Engineering Department for observation and study of the work of the Civil Engineer in all types of municipal planning, engineering and surveying.

Indiana Tech Official Bench Mark

A bench mark, consisting of a round bronze plug, three inches in diameter, has been established for Indiana Technical College by its student civil engineers. The elevation of this station above mean sea-level has been carefully determined by repeated field surveys and has been checked with government bench marks.

COURSE IN CIVIL ENGINEERING

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

M	2	Trigonometry	5
Engl	2	English II	5
Ch	2	General Chemistry II	5
Ch	2A	Gen. Chem. Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

M	3	Analytic Geometry	5
Ph	1	Physics I	5
CE	1	Surveying I	5
ED	10	Descriptive Geometry	3
ED	3	Engineering Drawing III	2
			20

Term IV

M	4	Differential Calculus	5
CE	2	Surveying II	5
Ph	2	Physics II	5
AM	1	Applied Mechanics I	5
			20

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
CE	3	Geology	5
AM	2	Applied Mechanics II	5
SM	1	Strength of Materials I	5
			20

Term VI

M	6	Calculus	5
SM	2	Strength of Materials II	5
CE	20	Structural Design I	5
EE	10	Electrical Engineering	5
			20

Term VII

CE	12	Hydraulics	5
CE	21	Structural Design II	5
CE	30	Concrete I	5
CE	11	Railway and Highway Engineering	5
			20

Term VIII

CE	22	Structural Design III	5
Law or Ec	1 or 1	Engineering Law or Economics	5
CE	10	Municipal Engineering	5
CE	31	Concrete II	5
			20

By Special Arrangement

CE	102	Concrete III	5
CE	110	Seminar	3

Two-year Course (24 Months)—158 Term Hours

Electrical Engineering

The two-year, or twenty-four months' course, in Electrical Engineering is planned, first of all, to give the student a thorough foundation in mathematics, science and engineering drawing. Instead of deferring the subjects of Electrical Engineering and the accompanying laboratory work, they are introduced from the very first. The remainder of the course stresses:

DIRECT CURRENT CIRCUITS —electric, magnetic, and dielectric.

DIRECT CURRENT MACHINES—generators, motors and lifting magnets.

ALTERNATING CURRENT CIRCUITS—series and parallel circuits with constant concentrated characteristics — single phase and polyphase circuits—network theorems.

ALTERNATING CURRENT MACHINES — alternators, transformers, induction motors, rectifying devices—rotary convertors, thermionic rectifiers.

ELECTRICAL DESIGN—condensers, insulators, power cables, electro-magnets, transformers, direct current generators, polyphase induction motors.

The Electrical Engineer must be familiar with his field, including the mechanical as well as the electrical aspects, whether he has to do with the housewife's electric iron or with the gigantic electric furnace. He must know how to select or how to design the correct motor in accordance with specific needs for power. He must have a practical as well as a theoretical knowledge and interest that will lead him to work out economies in powerhouse and production problems. His is the master mind in the field of communications. The modern automatic telephone with its instant and accurate service is a monument to his inventive genius and painstaking skill.

With the assurance of cheaper power, the fields of heating and illuminating are taking on an acceleration that will soon make the United States a nation that does its cooking, and most of its mechanical chores by the means of electricity. One readily foresees the immense demands that the development and utilization of power on a scale as contemplated by the electrification projects fostered by the federal government will make on the professionally trained man in the future.

Furthermore, the electrical engineer can find a separate field in the applications of electricity to chemical engineering in manufacturing processes concerned with ferro-alloys, aluminum, copper, caustic soda, carborundum, and in electrolysis.

There is also the specialization in Electronics which demonstrates the applications of the photo-cell, or "electric eye," whereby the inspection and measurement of mechanical parts is accomplished with a speed and accuracy that for all time eliminates the uncertainties of the human eye and hand.

The broad objective of the course in Electrical Engineering is to develop

the ability to analyze and solve Electrical Engineering problems from the business as well as from the technical standpoint. The student is encouraged to think independently and logically, and trained to assemble all the factors that enter into a given problem.

LABORATORY EQUIPMENT AND APPLICATIONS

The main E. E. Laboratory switchboard is arranged to provide the high degree of flexibility necessary for the numerous direct and alternating current experiments. It has available 3-Wire 110 volts A. C., 3-phase 220 volts A. C., 3-phase 440 volts A. C., 110 volts D. C., and 2-wire 230 volts D. C.

The E. E. Laboratory general equipment includes:

A 7½ H.P. 3-phase, 220 volt, convertible unit for use as a squirrel cage induction motor, as a wound rotor induction motor, as an alternator, or as a synchronous motor. When this assembly is used as a wound rotor induction motor, a drum switch controls starting, speed, and direction of rotation. Belted to the machine is a 5 K.W., 120 volts D.C. compound generator.

All machines are so arranged that it is possible to belt A.C. to D.C., or D.C. to D.C., thus making possible operation at varying speeds, voltages or loads.

There are 7 more motor-generator sets, ranging from 1¾ to 5 K.W. and 110 to 220 volts, for use in laboratory experiments. Two 3 K.V.A. laboratory transformers, 2 potential regulators, and a high-tension testing transformer compose the stationary A.C. equipment.

One 2 K.V.A. 2-phase synchronous converter, one 50 h.p. 3-phase squirrel cage induction motor, one 600 volt D.C. generator, and one 32 volt D.C. generator used for electroplating, provide additional facilities for experiments.

A high frequency transformer, powered by a 3 K.V.A., 30,000 volt 60-cycle transformer, is capable of producing potentials of more than one-half million volts.

Voltmeters, ammeters, wattmeters, watt-hour meters, tachometers, and minor items are other units of equipment in the E. E. laboratory.

E. E. Laboratory metering equipment includes:

- 10 precision A.C Instruments;
- 8 precision D.C. Instruments;
- 1 Leeds & Northrop Type K Potentiometer;
- 1 Kohlrausch slide wire bridge;
- 1 Eppley Standard Cell;
- Several Standard Multipliers and high capacity standard shunts.

Standardization of cables throughout the laboratory facilitates connections being made without the use of tools.

The E. E. Laboratory utilizes 2,000 square feet of floor space. The extensive range of experimentation is under the direct supervision of the Director of the Laboratory, assuring the student constant personal contact and assistance.

COURSE IN ELECTRICAL ENGINEERING

Term I

Cat. No.		Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
EE	1	Elementary Electricity and Magnetism	5
EE	1A	Electrical Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

Cat. No.		Subject	Cr. Hrs.
M	2	Trigonometry	5
Engl	2	English II	5
EE	2	Elementary Electrical Machines	5
EE	2A	Electrical Lab. 2A	2
ED	2	Engineering Drawing II.	2
			19

Term III

Cat. No.		Subject	Cr. Hrs.
M	3	Analytic Geometry	5
Ph	1	Physics I	5
EE	3	Direct Current Circuits	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
			22

Term IV

Cat. No.		Subject	Cr. Hrs.
M	4	Differential Calculus	5
Ph	2	Physics II	5
EE	4	Direct Current Machines	5
EE	4A	Electrical Lab. 4A	2
ED	3	Engineering Drawing III	2
			19

Term V

Cat. No.		Subject	Cr. Hrs.
M	5	Integral Calculus	5
AM	1	Applied Mechanics	5
ME	20	Engines and Boilers	5
EE	5	Alternating Current Circuits	5
			20

Term VI

Cat. No.		Subject	Cr. Hrs.
M	6	Calculus	5
AM	2	Applied Mechanics II	5
EE	6	Alternating Current Machines	5
EE	6A	Electrical Lab. 6A	2
ED	10	Descriptive Geometry	3
			20

Term VII

Cat. No.		Subject	Cr. Hrs.
SM	1	Strength of Materials I	5
ME	21	Thermodynamics	5
EE	21	Electrical Design I	3
EE	7	Alternating Current Machines	5
EE	7A	Electrical Lab. 7A	2
			20

Term VIII

Cat. No.		Subject	Cr. Hrs.
SM	2	Strength of Materials II.	5
Law	1	Engineering Law	5
EE	31	Electronics	5
EE	22	Electrical Design II	3
ME	1	Machine Shop I	2
			20

Two-year Course (24 Months)—159 Term Hours.

The Field of Mechanical Engineering

Whether power results from the burning of coal or coke, or from the burning of liquid fuel directly, as in gasoline or Diesel engines, it is the job of the Mechanical Engineer to construct the elements of power construction and to facilitate the application of power to the smallest or to the largest demands of industry. He invents, designs and makes the necessary engines of power production, and constructs the transmission machinery to vary the application of power in volume and intensity befitting the wind-mill or the ocean liner.

Not only does he make all the machinery of factory and farm, and of transportation, but he makes the designs, the models, the patterns, the fast-cutting tools, the grinders, the drills and shapers that perform the thousands of exacting operations in making a tractor, an automobile or a Diesel locomotive. Every manufactured article, no matter what its nature, requires the services of mechanical engineers both in the design of the machines by which it is manufactured and in the operation of the factory itself, so that the development of any new device or industry increases the demand for mechanical engineers.

The varied equipment of the modern machine shop—the lathes, planers, shapers, milling machines, grinders, etc., are all creatures of the brain of the Mechanical Engineer, and are accurate untiring servants of his will, combining to produce a steady flow of manufactured parts that are assembled with scientific precision to supply the ever-increasing demands for machines of all kinds. The steel mill with its enormous power plant and gigantic machines for handling and refining ore, and for shaping iron and steel products, is one of the most impressive examples of modern mechanical engineering.

The entire field of office appliances—typewriters, comptometers, adding, listing and billing machines, cash registers, folding and cancelling machines, light weight safes, modern filing equipment, the gadgets in use about an office—all are products of the ingenuity and skill of the Mechanical Engineer.

Rapid progress in the fields of refrigeration and air conditioning open interesting special branches of mechanical engineering. The architect and civil engineer collaborate in the construction of the factory or office building, but the problems of heating and ventilating, air purification and air conditioning, are solved by the mechanical engineer.

The Mechanical Engineer cooperates with the Aeronautical Engineer in making the modern high-power aircraft engine and in the application of its power. He cooperates with the Electrical Engineer in converting the power of waterfalls, turbines, and liquid fuel engines into electrical energy.

The Mechanical Engineer has served industry in the standardization of various mechanical parts, so that interchangeability and standard specifications may facilitate construction and replacement at the lowest expense.

The Mechanical Engineer is not a machinist, a mechanic, or an engine-

man. Nor is he a tradesman. He is all of these and more. He is a scientist, a mathematician, a draftsman, a designer, and an originator as well as an efficiency expert. The young man who has become efficient in the broad fundamental principles of mechanical engineering can, in a short time, make himself indispensably valuable in any one of hundreds of types of industry.

LABORATORY APPLICATION AND DEVELOPMENT

The Mechanical Engineering course follows the Tech plan of laying a strong basis in mathematics, drawing, and science, expanded into the applied technical subjects of Metallurgy, Engines and Boilers, Hydraulics, Mechanics, Electricity, Machine Design, and Internal Combustion Engines, which in their turn find expression in shop and laboratory courses.

The Mechanical Laboratory contains a 3-unit assembly of a conventional solid-injection Diesel and a standard gasoline engine, belt-connected with a generator, for comparative testing and experimentation in the conversion of heat into electrical energy. Other engines, including a standard radial aircraft engine, are displayed for study. There are also facilities for testing oil as to flash, pour, and cloud points to illustrate standard procedure in scientific oil and fuel testing. Students electing refrigeration and air conditioning are provided with units from prominent manufacturers for study and testing. Likewise, inspection trips in Fort Wayne are possible to see modern refrigeration and air conditioning machinery in the process of manufacture.

The machine shop is equipped with lathes, drill presses, planers, milling-machine, power saw, and related equipment including tools and gauges. The student acquires a fundamental knowledge of machine and shop operation that readily transfers to the operation of more diversified machinery in manufacturing processes, and to the planning and control of production flow.

Fundamental machining operations teach the properties and the utility of the typical metals, such as steel, copper, brass, bronze, aluminum, and various alloys. In the design courses this knowledge is readily applied to the composition of a piece of machinery to meet modern requirements as to manufacturing economy and efficiency.

AIR CONDITIONING AND DIESELS

The field of mechanical engineering is so broad that no man can be an authority on all its branches. Practicing engineers tend to become specialists in chosen branches. Indiana Technical College offers the student electives, so that he may begin his specialization in college. Air Conditioning and Internal Combustion Engines are two such specialized courses. Students selecting either of these specializations will round off their fundamental training with an intensive study of both theory and practice in these rapidly developing industries. In the Internal Combustion Engines elective, for example, in addition to a thorough study of the fundamental principles of internal combustion engines, whether for automobile, tractor, aviation, or stationary purposes, special attention is given to the high-speed lightweight Diesel for automotive and aviation application.

COURSE IN MECHANICAL ENGINEERING

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
Engl	1	English I	5
ED	1	Engineering Drawing I	2
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
Ch	2	General Chemistry II	5
Ch	2A	Gen. Chem. Lab. 2A	2
Engl	2	English II	5
ED	2	Engineering Drawing II	2
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
M	3	Analytic Geometry	5
Ph	1	Physics I	5
Law	1	Engineering Law or Economics	5
ED	3	Engineering Drawing III	2
ME	1	Machine Shop I	2
			19

Term IV

Cat.	No.	Subject	Cr. Hrs.
M	4	Differential Calculus	5
Ph	2	Physics II	5
AM	1	Applied Mechanics I	5
ED	10	Descriptive Geometry	3
ME	2	Machine Shop II	2
			20

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
AM	2	Applied Mechanics II	5
SM	1	Strength of Materials I	5
ME	20	Engines and Boilers	5
			20

Term VI

Cat.	No.	Subject	Cr. Hrs.
M	6	Calculus	5
SM	2	Strength of Materials II	5
ME	10	Mechanism	5
ME	21	Thermodynamics	5
			20

Term VII

Cat.	No.	Subject	Cr. Hrs.
ME	12	Machine Design I	5
ME	30	Internal Combustion Engines	5
or			
ME	35	Heating and Air Conditioning	
EE	10	Electrical Engineering X	5
CE	1	Surveying I	5
			20

Term VIII

Cat.	No.	Subject	Cr. Hrs.
ME	13	Machine Design II	5
or			
ME	31	Internal Combustion Engine Design	
or			
ME	34	Refrigeration Design	
ME	37	Heating and Air Conditioning Design	
ME	32	Refrigeration	5
or			
ME	36	Heating and Air Conditioning II	
ME	25	Mechanical Laboratory	2
ME	45	Seminar	3
CE	12	Hydraulics	5
			20

NOTE: By taking one additional term all of the Specialized Electives in Terms VII and VIII may be included.

Two-year Course (24 Months)—157 Term Hours.

MECHANICAL DRAFTING COURSE

The course in Mechanical Drafting is intended to meet the needs of students who desire a career in drafting and design rather than in engineering work. The subject-matter of the Course has been selected or created to provide (1) skill in the mechanical operations of drafting; (2) knowledge of fundamental mathematics and science required for the computations a draftsman must make; and (3) a knowledge of design. The fundamental plan of the course emphasizes the fact that the trained mind behind the pencil is of greater importance than the required mechanical skill.

Industry requires: First, the ability to produce AT ONCE on the drawing board; and, Second, a necessary knowledge of fundamental mathematics, science and engineering to attack its problems, and to acquire, with a minimum of individual instruction, the further specialized knowledge required in each individual industry.

By virtue of the five courses in Engineering Drawing, graduates will be able to undertake with confidence any drawing which their employer may assign them. Because of the courses in science and mathematics, they will also understand the purpose of the machine part they are drawing, and the reason for its size and shape. And finally, they will have a firm foundation on which to build the specialized knowledge which distinguishes the Chief Draftsman from those under his direction.

Seventy-five per cent of the subject-matter is identical to that in the regular engineering courses. This course, therefore, also appeals strongly to the man who at the time can see his way clear to only one year in college, but who hopes later to return and receive his engineering degree.

OUTLINE OF MECHANICAL DRAFTING COURSE

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	Algebra	5
ED	1	Engineering Drawing I	2
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
Engl	1	English I	5
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
ED	2	Engineering Drawing II	2
ED	3	Engineering Drawing III	2
Ch	2	General Chemistry II	5
Engl	2	English II	5
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
ED	4	Engineering Drawing IV	2
ME	1	Machine Shop I	2
ME	10	Mechanism	5
AM	3	Elements of Applied Mechanics	5
Ph	1	Physics I	5
			19

Term IV

Cat.	No.	Subject	Cr. Hrs.
ED	5	Tracing	2
ME	2	Machine Shop II	2
ME	11	Elementary Machine Design	5
SM	3	Elements Strength of Materials	5
Ph	2	Physics II	5
			19

One-year Course (12 Months)—76 Term Hours.

Radio Engineering

INCLUDING TELEVISION

The course in Radio and Television Engineering includes the customary work in mathematics, science and engineering drawing and twenty-six term hours in Electrical Engineering plus the accompanying laboratory work. The course is planned to specialize a fundamental knowledge of electrical engineering to scientific application in the field of radio and television. This end is accomplished by including sixty-seven hours in the subjects of Radio and Television Theory, Code, Measurements, Radio Engineering, Communication, Laboratory Work, and Seminar, a specialization found in few courses offered in this field.

The ready transmission of sound and its reception has been a great boon to modern civilization. Now the poor as well as the rich have the delights of the world's best music, entertainment and information at their own firesides. American homes contain between twenty-two and twenty-three million receiving sets. Continued improvement prompts constant replacement of these sets with others still more compact and efficient—more precise and accurate in operation. The advent of television will bring about radical changes in receiving sets and a complete revolution of structure and function of the entire network of broadcast stations, leaving no end of work for the competent engineer.

Comparative improvements will come in the commercial, marine and aircraft fields. In a recent talk before a Tech convocation, an authority on air transportation sketched the future place of radio in the navigation of aircraft and in landing technique. Radio as applied to aero-navigation is becoming one of the most important phases of engineering. Through the contributions of radio engineers, planes are able to fly distances through adverse weather on schedule time, and land in perfect safety.

The electron telescope, a contribution of the radio engineer, is an ultra-new development similar to the cathode ray tube, which enables the pilot to see the landing field and the runways ahead through fog so thick as to blind the most powerful searchlight. Radio Engineering is based primarily on a knowledge of the mechanism and structure of the atom. The electron tube, outgrowth of research and study, has revolutionized many industrial technical methods. It has well-nigh given machines the power to think. It enables them to sort packages, grade textiles, differentiate colors, stoke furnaces, treat diseases, and measure the heat of distant stars. Its applications apparently are limitless, and all are specializations of radio engineering. No other field of engineering is changing more rapidly or more radically, or holds more promise in its developments than radio.

For a description of the Electrical Engineering Laboratory, the reader is referred to Page 23. The 50 ft. by 40 ft. laboratory is very completely equipped for the numerous experiments included in this course.

Radio Laboratory Practice

Laboratory work is given partly to present a tangible explanation of radio theory as studied, and partly to learn new methods of application. Experimental set-ups are made by the student to enable him to prove to his own satisfaction the truth of the theory he has learned.

The multi-purpose Oscillograph, for example, shows what electrical surges actually look like, and the effect of one wave upon another. It presents a new method of investigating high frequency phenomena which heretofore was only partially provided by meters and other measuring instruments. It also provides analytical results in regard to various apparatus to which it is connected. The use of the Oscillograph with the high fidelity amplifier enables the student not only to hear the results of his experiments, but to see them as well. The Cathode Ray tube is much larger than those ordinarily in use; therefore, it enables the student to detect very minute manifestations of radio phenomena that would otherwise escape unnoticed.

The Amateur transmitter (W9LWK) is of the very latest design. It is used for teaching traffic control and for experience in communication with other 'phone and code stations, as a supplement to the radio code courses.

Supplementary to the laboratory work frequent excursions are made to the 10,000-watt transmitter of WOWO where detailed study and inspection are made of the equipment and the technic of operating a modern high-power broadcast station.

Special apparatus is constantly under process of design and construction. Some of the standard apparatus in use:

Radio Frequency Resistance Bridge;
Beat Frequency Oscillator;
Television Transmitter and Receiver;
Multi-Purpose Oscillograph including a specially designed 9-inch Cathode Ray Tube;
Precision Wave Meter;
Ultra-Sensitive Vacuum Tube Voltmeter;
Leeds & Northrup (Type K) Potentiometer;
3″ Oscilloscope;
External Sweep Circuit with Amplifier (for Television);
100-volt D-C Motor Generator Set;
Weston (Model 772) Set Analyzer;
Weston Photo Relay System;
1,000-cycle Audio Oscillator;
Two Laboratory Micro Ammeters;
Standard Signal Generator;
General-Purpose Precision A-C Bridge.

Because of the highly technical nature of most of the experimentation in the Radio Laboratory, the work is conducted under the direct supervision of the Director of the Department, assuring students of contact with an engineer thoroughly experienced in radio development and application.

COURSE IN RADIO ENGINEERING

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
EE	1	Elementary Electricity and Magnetism	5
EE	1A	Electrical Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
Engl	2	English II	5
EE	2	Elementary Electrical Machines	5
EE	2A	Electrical Lab. 2A	2
ED	2	Engineering Drawing II.	2
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
M	3	Analytic Geometry	5
RE	2	Radio Theory II	5
RE	2A	Radio Theory 2A	2
EE	3	Direct Current Circuits	5
ED	3	Engineering Drawing III	2
			19

Term IV

Cat.	No.	Subject	Cr. Hrs.
M	4	Differential Calculus	5
RE	3	Radio Theory III	5
RE	3A	Radio Theory 3A	2
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
			19

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
RE	4	Radio Engineering I	5
RE	4A	Radio Measurements	3
Ph	1	Physics I	5
ME	1	Machine Shop I	2
	or		
RE	12	Radio Shop	
			20

Term VI

Cat.	No.	Subject	Cr. Hrs.
M	6	Calculus	5
RE	5	Radio Engineering II	5
RE	5A	Radio Measurements	3
EE	4	Direct Current Machines	5
EE	4A	Electrical Lab. 4A	2
			20

Term VII

Cat.	No.	Subject	Cr. Hrs.
RE	7	Communication Engineering I	5
Ph	2	Physics II	5
Law	1	Engineering Law	5
RE	103	Radio Design	5
			20

Term VIII

Cat.	No.	Subject	Cr. Hrs.
RE	8	Communication Engineering II	5
RE	9	Transient Currents	5
RE	110	Seminar	3
RE	120	Thesis	5
			18

CODE: 1, 2, and 3 elective (see p. 43) for those who wish to qualify for Federal Communications Commission examinations.

Two-year Course (24 Months)—154 Term Hours.

Description of Courses

Excepting those common to all departments, the courses offered are here grouped according to departments, with a brief outline of their content, followed by the names of text and author.

Explanation of the credit rating of college courses:

"ENGLISH 1. (5 plus 0) Credit 5." This means that the first term of English is taught five periods a week, with no laboratory work, and entitles the student to five term hours of credit toward his degree. The figure before the word "plus" indicates weekly classroom recitations, and the figure after the word "plus" indicates the periods per week spent in the laboratory, drawing room, or on field trips.

General

Ec 1 ECONOMICS. (5 plus 0) Credit 5.
Must be preceded by English I and II. A study of the basic principles upon which business proceeds in a society, emphasizing the economic relationships of the engineer.
Principles of Economics—Deibler.

Law 1 ENGINEERING LAW. (5 plus 0) Credit 5.
For upper classmen. A study of legal principles applied to specifications and engineering contracts; safeguards in the preparation of contracts; legal relationship of engineers; the laws of business documents.
Contracts in Engineering—Tucker.

Engl 1 ENGLISH I. (5 plus 0) Credit 5.
The mechanics of writing; the composition as a whole; exposition is emphasized; vocabulary building through oral and written expression; formal book reviews; one long paper.
Handbook of English in Engineering Usage; and Sup. Exercises—Howell.

Engl 2 ENGLISH II. (5 plus 0) Credit 5.
Must be preceded by English I. Professional and business writing; selling the technical man's services; presentation of oral and written reports from the engineering viewpoint.
Text same as for English I.

AM 1 APPLIED MECHANICS I. (5 plus 0) Credit 5.
Must be preceded by Mathematics 4. Theory and general principles; concurrent forces; coplaner and non-coplaner; parallel forces; stresses in trusses and bents; friction; classes and laws; graphic and algebraic solution.
Applied Mechanics—Poorman.

AM 2 APPLIED MECHANICS II. (5 plus 0) Credit 5.
Must be preceded by Applied Mechanics I. Con. of Applied Mechanics I. Centroids and centre of gravity planes and axes of symmetry; centroids of force systems; moment of inertia of areas; polar moments and computations; rectilinear and curvilinear motion; moment of inertia of masses; rotation and translation; work and power.
Text same as for Applied Mechanics I.

AM 3 ELEMENTS OF APPLIED MECHANICS. (5 plus 0) Credit 5.
Must be preceded by Mathematics II and accompanied by Physics I. A course covering the essentials of Applied Mechanics I and II, for Drafting students only.
Practical Mechanics and Strength of Materials—Leigh and Mangold.

SM 1 STRENGTH OF MATERIALS I. (5 plus 0) Credit 5.
Must be preceded by Applied Mechanics I. Theory and principles; elastic stresses and deformations; tension, compression, and shear; design of riveted joints; shear and moment diagrams; stresses and deflection in simple and cantilever beams; uniform and concentrated loads; fixed and continuous beams.
Strength of Materials—Poorman.

SM 2 STRENGTH OF MATERIALS II. (5 plus 0) Credit 5.
Must be preceded by Strength of Materials I. Continuation of Strength of Materials I. Resilience; torsion; combined stresses; flexual and direct stresses; eccentric loading; normal shearing stresses; theory of columns; Euler's and Rankine's formulae; straight line and general formulae; deflection of beams by moment area method.
Text same as for Strength of Materials I.

SM 3 ELEMENTS OF STRENGTH OF MATERIALS. (5 plus 0) Credit 5.
A brief course for Mechanical Drafting Course students.
Same as for AM III.

Ph 1 PHYSICS I. (5 plus 0) Credit 5.
Must be preceded by Trigonometry. Analytical Physics. Lectures on Mechanics, with recitations on the practical applications of these subjects, covering the following: Composition and resolution of forces; vectors; work; energy; motion of translation and rotation; torque; moments; law of friction; uniform linear motion; uniform angular motion; circular motion; elasticity; Hooke's law; Young's modulus molecular properties of matter; law of fluids; Boyle's law; simple harmonic motion; pendulum; wave motion.
Textbook of Physics—Spinney.

Ph 2 PHYSICS II. (5 plus 0) Credit 5.
Must be preceded by Physics I. Analytical Physics. Continuation of Physics I, consisting of lectures on heat and light, with recitations on the practical application of these subjects. Heat and temperature; change of state; conduction, convection and radiation; expansion; thermodynamics; nature of light reflection and refraction; diffraction laws of mirrors and lenses; lens systems; optical instruments.
Text same as for Physics I.

PREPARATORY, non-credit courses are open to those whose high school curriculums lacked sufficient coverage to meet entrance requirements, or for those who need review.

MATHEMATICS

M 1 COLLEGE ALGEBRA. (5 plus 0) Credit 5.
Must be preceded by Algebra C or its equivalent. Factoring, theory of exponents, fractions, quadratic equations, graphical representations, binomial theorem, simultaneous equations and logarithims.
College Algebra—Rosenbach and Whitman.

M 2 TRIGONOMETRY. (5 plus 0) Credit 5.
Must be proceded by College Algebra. Elements of Trigonometry, the relations between trigonometric functions; solution of right triangles, functions of large angles, practical applications; functions involving more than one angle and solutions of oblique triangles.
Plane and Spherical Trigonometry—Palmer and Leigh.

M 3 ANALYTIC GEOMETRY. (5 plus 0) Credit 5.
Must be preceded by Trigonometry. A study of the point, the straight line, equations and loci, conic sections, parametric and polar equations, including points, planes, lines and surfaces in space.
Brief Analytic Geometry—Mason and Hazard.

M 4 DIFFERENTIAL CALCULUS. (5 plus 0) Credit 5.
Must be preceded by Analytic Geometry. The rules of differentiation, maxima and minima, and other applications.
The Calculus—Dalaker and Hartig.

M 5 INTEGRAL CALCULUS. (5 plus 0) Credit 5.
Must be preceded by Differential Calculus. A study of indefinite and definite integrals and methods of integration.
Text same as for Differential Calculus.

M 6 CALCULUS. (5 plus 0) Credit 5.
Must be preceded by Integral Calculus. The practical applications of calculus, multiple integrals, series and hyperbolic functions.
Text same as for Differential Calculus.

M 101 DIFFERENTIAL EQUATIONS. (5 plus 0) Credit 5.
Must be preceded by Calculus. Course given by arrangement. Solution of linear differential equations and those of first and second order; singular and series solutions.
Differential Equations—Cohen.

AERONAUTICAL ENGINEERING

AeE 1 PRINCIPLES OF AERONAUTICS. (3 plus 0) Credit 3.
An introductory study of the construction and operation of airplanes; emphasizing modern improvements and developments, and outlining the essential parts of the airplane. Points out aerodynamic factors of airfoils; discusses at length the airplane engine; and indicates the methods used in designing the airplane structure, including wing, tail, fuselage, and landing gear. Open to non-aeronautical students.
The Airplane and Its Engine—Chatfield, Taylor and Ober.

AeE 2 AERODYNAMICS I. (5 plus 0) Credit 5.
Elementary aerodynamics, airfoils, wing lift and drag, parasite resistance, performance methods, stability, and analysis of forces causing fundamental motions of the airplane.
Elements of Practical Aerodynamics—Jones.

AeE 2A AERODYNAMICS LABORATORY 1A. (0 plus 6) Credit 2.
Taken in conjunction with Aerodynamics I. Wind tunnel testing of airfoils; determination of lift, drag and center of pressure by two methods.
Laboratory Fee, Per Term, $3.00.

AeE 3 AERODYNAMICS II. (5 plus 0) Credit 5.
Must be preceded by Aerodynamics I. Advanced aerodynamics and the study of stability, maneuverability, and controllability of airplanes. The student is required to compute the performance of a complete airplane by two methods.
Same text as for Aerodynamics I.

AeE 3A AERODYNAMICS LABORATORY 2A. (0 plus 6) Credit 2.
Taken in conjunction with Aerodynamics II. Wind tunnel testing of airfoils; primary structure and scale models for complete airplanes.
Laboratory Fee, Per Term, $3.00.

AeE 4 AERODYNAMICS III. (5 plus 0) Credit 5.
Advanced study and calculations of wing section data, airplane model tests, parasite drag data, control surface design, engine and propeller considerations, performances, variations of rate of climb with altitude, aspect ratio, and parasite drag, reduction of observed performance to standard conditions, range and endurance, special flight problems, performance estimation, and seaplane floats.
Engineering Dynamics—Diehl.

AeE 4A AERODYNAMICS LABORATORY 3A. (0 plus 6) Credit 2.
Advanced wind tunnel study and performance calculations.
Laboratory Fee, Per Term, $3.00.

AeE 6 METEROLOGY AND AVIGATION. (3 plus 0) Credit 3.
A study of Aeronautical Methods of weather observations and predictions, emphasizing cloud formations, wind velocities; directions aloft and at the ground, weather map interpretation and construction; and problems in aerial navigation.
Aerology—McGuire, and Supplementary Bulletins.

AeE 7 PROPELLER DESIGN. (5 plus 0) Credit 5.
Must be preceded by Aerodynamics I, Mathematics V and Physics II. Design and analysis of screw propellers according to the theories of Drzwiecki and others; analytical and graphical computations. Student designs a propeller according to U. S. Department of Commerce Regulations.
Aircraft Propeller Design—Weick.

AeE 8 AIRPLANE DESIGN I. (5 plus 0) Credit 5.
Must be preceded by Aerodynamics III and Mathematics VI. Study of several types emphasizing the trend in design of past and present airplanes; factors that dictate the type and design of an airplane; design and layout of complete airplane; preliminary balance, performance, and stress computations.
Airplane Structures—Niles and Newell.

AeE 8A AIRPLANE DESIGN LABORATORY 1A. (0 plus 15) Credit 5.
Layout of three-view drawing of airplane, complete stress analysis of wing structure for several conditions; spare designs, rib design, balance diagram, fuselage design and stress for several conditions, in accordance with U. S. Dept. of Commerce Regulations.

AeE 9 AIRPLANE DESIGN II. (0 plus 15) Credit 5.
Must be preceded by Propeller Design and Airplane Design I. Continuation and completion of Airplane Design I, including advanced problems by method of least work, and method of elastic weights, graphical and analytical stress analysis.
Text same as for Airplane Design I.

AeE 9A AIRPLANE DESIGN LABORATORY 2A. (0 plus 15) Credit 5.
Completion of individual design started in Airplane Design 1A. Complete stress-analysis of undercarriage for several conditions; design of all members of undercarriage, undercarriage fittings, and of adjustable stabilizer, stress and design of engine mount, and design of spar fittings, in accordance with U. S. Dept. of Commerce Regulations.

AeE 10 AEROSTATICS. (2 plus 0) Credit 2.
Sustaination and equilibrium of balloons and lighter-than-air craft; investigation of some of the aerodynamical and structural design problems of dirigibles. Intended primarily to enable the student better to evaluate lighter-than-air craft.
Aerostatics—Warner.

AeE 20 AIRCRAFT RADIO. (2 plus 0) Credit 2.
A general study of the usefulness of radio in aerial navigation, emphasizing variety of equipment available, method and general principle of operation of each type available, and Department of Commerce Requirements governing the operation of radio aircraft.
Department of Commerce Aeronautics Bulletin No. 27.

CHEMICAL ENGINEERING

Ch 1 GENERAL CHEMISTRY I. (5 plus 0) Credit 5.
Must be preceded by High School Chemistry. Basic laws and theories of chemistry. Introduction to non-metals.
Smith's General Chemistry—Kendall.

Ch 1A GENERAL CHEMISTRY LABORATORY 1A. (0 plus 6) Credit 2.
A laboratory study of general chemical principles.
Experiments and Problems for College Chemistry—Belcher and Colbert.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 2 GENERAL CHEMISTRY II. (5 plus 0) Credit 5.
Must be preceded by Chemistry I and 1A. Continuation of Chemistry I.
Text same as for General Chemistry I.

Ch 2A GENERAL CHEMISTRY 2A. (0 plus 6) Credit 2.
A continuation of Chemistry 1A.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 3A QUALITATIVE ANALYSIS. (0 plus 6) Credit 2.
Must be preceded by Chemistry II and 2A. A systematic qualitative analysis of the more common elements. Recitation work and problems on oxidation and reduction, and chemical equilibrium.
Qualitative Analysis—Anderson and Hazelhurst.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 4A QUANTITATIVE ANALYSIS I. (0 plus 6) Credit 2.
Must be preceded by Chemistry 3A. The Principles of Gravimetric Analysis.
Quantitative Analysis—Mahin.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 5A QUANTITATIVE ANALYSIS II. (0 plus 6) Credit 2.
Must be preceded by Chemistry 4A. The Principles of Volumetric Analysis applied to acidimetry and alkalimetry, reactions involving oxidation and reduction, and titrations involving the formation of precipitates.
Text same as for Quantitative Analysis I.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch. 6 ORGANIC CHEMISTRY I. (5 plus 0) Credit 5.
Must be preceded by Chemistry 3A. A study of the aliphatic compounds of organic chemistry. Special emphasis upon type reactions, structure of organic compounds, and isomerism.
Organic Chemistry—Norris.

Ch 6A ORGANIC CHEMISTRY LABORATORY 1A. (0 plus 6) Credit 2.
The preparation and study of properties of typical organic compounds.
A Laboratory Manual of Organic Chemistry—Fisher.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 7 ORGANIC CHEMISTRY II. (5 plus 0) Credit 5.
Must be preceded by Chemistry 6. A continuation of Organic Chemistry I. The study of the aromatic compounds of Organic Chemistry.
Text same as for Organic Chemistry I.

Ch 7A ORGANIC CHEMISTRY LABORATORY 2A. (0 plus 6) Credit 2.
A continuation of Chemistry 6A.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 8 PHYSICAL CHEMISTRY I. (5 plus 0) Credit 5.
Must be preceded by Chemistry 4A, 5A, 6A, 7A, and Mathematics VI. A critical study of substances in the gaseous, liquid, and solid states, and solutions.
Physical Chemistry for Colleges—Millard.

Ch 8A PHYSICAL CHEMISTRY LABORATORY. (0 plus 6) Credit 2.
Selected list of experiments illustrating the laws of chemistry.
Laboratory Experiments on Physico-Chemical Principles—Sherrill.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 9 PHYSICAL CHEMISTRY II. (5 plus 0) Credit 5.
A continuation of Physical Chemistry I. Homogeneous equilibrium, heterogeneous equilibrium, electrochemistry.
Text same as for Physical Chemistry I.

Ch 101A APPLIED ANALYSIS. (0 plus 6) Credit 2.
Must be preceded by Chemistry 4A and 5A. Analysis of industrial products and raw materials; practical application of the principles of gravimetric and volumetric analysis to testing and analysis of materials of importance to industry. Options in: (a) Analysis of Iron and Steel; (b) Analysis of Oils, Fats, and Waxes; (c) Food Analysis.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

ChE 1 CHEMICAL ENGINEERING I. (5 plus 0) Credit 5.
Must be preceded or accompanied by Chemistry 8. A study of the principles of fluid flow, heat flow, and diffusion.
Elements of Chemical Engineering—Badger and McCabe.

ChE 2 CHEMICAL ENGINEERING II. (5 plus 0) Credit 5.
Must be preceded or accompanied by Chemistry 9. A continuation of Chemical Engineering I. A study of the unit processes, such as evaporation, drying, distillation, crushing and grinding.
Text same as for Chemical Engineering I.

ChE 3 CHEMICAL ENGINEERING III. (5 plus 0) Credit 5.
Chemical Engineering Seminar. A series of ten reports by each student on selected topics in Chemistry and Chemical Engineering. Use and sources of chemical literature and patents.

ChE 4A CHEMICAL ENGINEERING PLANT DESIGN. (0 plus 6) Credit 2.
Application of physical, chemical and mechanical principles to design of machinery and equipment of chemical engineering. Flow sheets and selection of process equipment; plant layout and arrangement.
Chemical Engineering Plant Design—Vilbrandt.

CIVIL ENGINEERING

CE 1 SURVEYING I. (3 plus 6) Credit 5.
Must be preceded by Trigonometry and Engineering Drawing I. Theory and principles; field book; theory of field notes; construction, care and use of level and transit; leveling and checking; profiling; compass surveying; methods of angle reading with transit traverse; computations of areas; errors of closure.
Principles and Practice of Surveying, Vol. I—Breed and Hosmer.
Laboratory Fee, Per Term, $3.00.

CE 2 SURVEYING II. (3 plus 6) Credit 5.
Must be preceded by Plane Surveying. Continuation of Plane Surveying, Topographical Surveying; contours; mapping and theory of map scales; theory and methods of United States land surveys; triangulation and precise leveling; hydrographic and geodetic surveying; stellar and solar determination of meridian; stadia surveying and note plotting; use of mapping and plotting instruments.
Same as Surveying I.
Laboratory Fee, Per Term, $3.00.

CE 3 GEOLOGY. (5 plus 0) Credit 5.
Must be preceded by College English I. Physical, historical, and structural geology; rocks and their relation to engineering work; rock-weathering and soil; control of rivers; relation of wave action and short currents to coasts and harbors; origin of lakes and swamps, and their relation to engineering work; landslides, land subsidence; importance of glacial deposits; dams and reservoirs; road foundations and road materials.
Elements of Engineering Geology—Ries and Watson.

CE 10 MUNICIPAL ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Plane Surveying. City and town planning and surveying; sewerage and sewage disposal; processes; disposal plants; water supply and purification; reservoirs and wells; materials and equipment. Problems: design of a sewerage system and design of a water supply system, complete with drawings; field work as required.
Civil Engineering Handbook—Urquhart, with supplementary references.

CE 11 RAILWAY AND HIGHWAY ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Plane Surveying. Location surveys; vertical and horizontal curves; easement spirals; widening and superelevation for pavement and track curves; turnouts and crossings; switches and frogs; earthwork; construction and maintenance of pavements; costs. Problems; completed designs with drawings; field work as required.
Railway Curves and Earthwork—Allen, with supplementary references.

CE 12—HYDRAULICS. (5 plus 0) Credit 5.
Must be preceded by Physics I and II, and Mathematics IV and V. Units and notations; hydrostatics; theory of pressures; hydrokinetics; flow of water through conduits, weirs; nozzles and orifices.
Hydraulics—Schoder and Dawson.

CE 20 STRUCTURAL DESIGN I. (5 plus 0) Credit 5.
Must be preceded by Applied Mechanics I and Engineering Drawing I. Analysis of stresses, general theory of graphical determination of stresses; condition of equilib-

rium; moments; analysis of beams and simple framed structures; analysis of standard roof trusses including determination of member stresses under dead load, roof covering loads; wind and snow loads; design and analysis of roof systems; analysis of stresses in bents, towers, and similar structures; analysis of railroad bridges, high and low truss.

Analysis of Framed Structures—Matthews and Soneson.

CE 21 STRUCTURAL DESIGN II. (5 plus 0) Credit 5.
Must be preceded by Structural Design I, Applied Mechanics II, and Strength of Materials I. Types of bridges; conditions of loading; stress analysis; computation of maximum and minimum streesses; dead, live, and wind loads; design of beam bridge; design of plate girder bridge; design of low truss highway bridge. Designs to include complete drawings and tabulations of calculations.

Structural Design in Steel—Shedd.

CE 22 STRUCTURAL DESIGN III. (5 plus 0) Credit 5.
Must be preceded by Structural Design II. Continuation of Structural Design II. Abutments, piers and foundations; fixed end bridges; design of slab and T-beam concrete highway bridges; engine loads; analysis of wheel positions; design of high truss highway bridge. Designs to include complete drawings and tabulations of calculations.

Text same as for Structural Design II.

CE 30 CONCRETE I. (5 plus 0) Credit 5.
Must be preceded by Engineering Drawing I, Applied Mechanics II, and Strength of Materials I. Theory and principles of reinforced concrete design; water-cement ratio; rapid hardening cements; proportioning of aggregates; tests; Joint Committee's recommendations. Complete designs of slabs, rectangular and T-beams, with drawings.

Design of Concrete Structures—Urquhart & O'Rourke.

CE 31 CONCRETE II. (5 plus 0) Credit 5.
Must be preceded by Concrete I. Columns; axial and eccentric loads; continuous beams and frames; conditions of end connections and restraint; foundations; bearing power of soils; footings. Complete designs with computation and drawings.

Text same as for Concrete I.

CE 32 CONCRETE III. (5 plus 0) Credit 5.
Must be preceded by Concrete II. Reinforced concrete buildings; building codes; floor systems; surfacing; wall beams; retaining walls; loading and earth thrust; gravity; cantilever, and counterfort walls; arches; circular, multicentered, and parabolic types; methods of analysis; resultant thrusts; abutments. Forms; theory and details of form construction. Complete designs, with all necessary computations and drawings.

Design of Concrete Structure—Urquhart & O'Rourke.

CE SEMINAR. (3 plus 0) Credit 3.

ELECTRICAL ENGINEERING

EE 1 ELEMENTARY ELECTRICITY AND MAGNETISM. (5 plus 0) Credit 5.
Must be preceded or accompanied by Mathematics I. Ohm's law, electrical power and energy, circular measure, resistivity, resistance, measurements, magnetism, electromagnetism, the magnetic circuit, batteries, electrochemical action and electrostatics.

Elements of Electricity—Timbie.

EE 1A ELECTRICAL LABORATORY 1A. (0 plus 6) Credit 2.
Must be preceded or accompanied by Electrical Engineering I and preceded or accompanied by Mathematics II. Laboratory procedure, report writing, engineering graphs, electrical conductors, wire joints, lighting circuits, resistance measurements, magnetism, electro-magnetism, wiring methods, plans and estimates.

Tech Laboratory Instruction Sheets.

Laboratory Fee, Per Term, $3.00.

EE 2 ELEMENTARY ELECTRICAL MACHINERY. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering I. Generator principles, armature re-

action, direct current motors, inductance, capacitance, single-phase alternating current circuits, balanced polyhase alternating current circuits, vacuum tubes.

Text same as for Electrical Engineering I.

EE 2A ELECTRICAL LABORATORY 2A. (0 plus 6) Credit 2.
Must be preceded by Electrical Engineering 1A and preceded or accompanied by Electrical Engineering II. Shunts and multipliers, storage battery, electro-magnetic induction, dynamo construction features, shunt generator, series, compound, and third-brush generator, shunt series and compound motor.

Electrical Laboratory Experiments—Dennison.

Laboratory Fee, Per Term, $3.00.

EE 3 DIRECT CURRENT CIRCUITS. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering II. Laws and definitions of electric and magnetic circuits, electrostatics, conductors and insulators, electromagnetism, B-H curves, electric circuits, induction, generators, and outside problems.

Electrical Circuits and Machinery, Continuous Currents—Morecroft and Hehre.

EE 4 DIRECT CURRENT MACHINES. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering III. D. C. generators and motors, armature reaction, winding, commutation, rheostats, efficiency, heating and rating of machines, switches, relays, regulators, batteries, care and operation of machinery and meters.

Text same as for Electrical Engineering III.

EE 4A ELECTRICAL LABORATORY 4A. (1 plus 4) Credit 2.
Must be preceded by Electrical Engineering 2A and preceded or accompanied by Electrical Engineering IV. Three-wire lighting, hysteresis loops by traction and fixed point method, flux distribution in generator, calculation of magnetization curve, regulation of shunt generator, shunt generators in parallel, efficiency by feed-back methods, efficiency by stray loss method.

Text same as for Electrical Engineering 2A.

Laboratory Fee, Per Term, $3.00.

EE 5 ALTERNATING CURRENT CIRCUITS. (5 plus 0) Credit 5.
Must be preceded or accompanied by Math 5. Vector analysis of alternating current circuits, study of the complex systems of notation, study of inductive and capacitive circuits, power factor, power measurements, single-phase and polyphase circuits.

Electric Circuit Analysis—Malti.

EE 6 ALTERNATING CURRENT MACHINES. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering V. Single-phase and polyphase alternators; study of transformers.

Alternating Current Machines—Puchstein and Lloyd.

EE 6A ELECTRICAL LABORATORY 6A. (1 plus 4) Credit 2.
Must be preceded by Electrical Engineering 4A and preceded or accompanied by Electrical Engineering VI. Alternating current phenomena, including: single-phase circuits, balanced and unbalanced polyphase circuits, determination of phase sequence, transformer construction, ratios, polarity, vector diagram, efficiency and regulation, theory and use of current transformers, induction motor no-load losses, induction motor circle diagram, magnetization curve, characteristic curve, and short-circuited curve of alternator.

Text same as for Electrical Engineering 4A.

Laboratory Fee, Per Term, $3.00.

EE 7 ALTERNATING CURRENT MACHINES. (5 plus 0) Credit 5.
Induction motors, synchronous motors, synchronous condensers, fractional horse power motors, rectifying devices, power transmission and distribution.

Text same as for Electrical Engineering VI.

EE 7A ELECTRICAL ENGINEERING 7A. (1 plus 3) Credit 2.
Calibration of watt-hour meters, insulation testing, fault-finding in cables, high voltage phenomena.

Text same as for Electrical Engineering 6A.

Laboratory Fee, Per Term, $3.00.

EE 10 ELECTRICAL ENGINEERING. (5 plus 0) Credit 5.
General electricity theory and practice for students not in electrical engineering courses. Elementary A. C. and D. C. theory, and accompanying laboratory work.
Principles of Electrical Engineering—Blalock.

EE 21 ELECTRICAL DESIGN I. (0 plus 9) Credit 3.
Must be preceded or accompanied by Electrical Engineering V. Principles of electrostatics. Design of insulators and condensers. Determination of capacities by dielectric flux plotting. Core and shell type distributing transformers, efficiency, heating and rating.
Elements of Electrical Design—Still.

EE 22 ELECTRICAL DESIGN II. (0 plus 9) Credit 3.
Design of direct current generator, armature, commutator, shunt and series field windings, commutating poles. Design and performance of polyphase induction motor.
Text same as for Electrical Design I.

EE 31 ELECTRONICS. (5 plus 0) Credit 5.
Study of essential types of electron tubes, the physics of their operation, their characteristics and applications, in all types of amplifiers, modulators, defectors, oscillators, rectifiers, inverters, relays, photoelectric control circuits; x-ray, cathode ray, electron-ray and other special equipment.
Fundamentals of Electron Tubes—Eastman.

MECHANICAL ENGINEERING

ME 1 MACHINE SHOP I. (0 plus 6) Credit 2.
Operation of fundamental types of shop machines, such as the lathe, drill press, shaper and milling machine, and study of tool shapes and cutting speeds.
Machine Tool Work—Turner.
Laboratory Fee, Per Term, $3.00.

ME 2 MACHINE SHOP II. (0 plus 6) Credit 2.
To be preceded by Machine Shop I. Continuation of Machine Shop I.
Text same as for Machine Shop I.
Laboratory Fee, Per Term, $3.00.

ME 10 MECHANISM. (3 plus 6) Credit 5.
Must be preceded by Engineering Drawing III, and preceded or accompanied by Applied Mechanics I. A study of the motions of machine parts, and the design of machines without consideration of strength. Belting, cams, linkages, and gears.
Machine Design—Hyland and Kommers.

ME 11 ELEMENTARY MACHINE DESIGN. (3 plus 6) Credit 5.
Must be preceded by Mechanism and Elements of Applied Mechanics, and accompanied by Elements of Strength of Materials. Design of simple machine parts subject to static loadings only.
Text to be selected.

ME 12—MACHINE DESIGN I. (3 plus 6) Credit 5.
Must be preceded by Mechanism and Applied Mechanics II, and Strength of Materials I. Design of simple machine parts, and of complete machines such as hand presses, and derricks, in which the stresses are chiefly static.
Machine Design—Hyland and Kommers.

ME 13 MACHINE DESIGN II. (3 plus 6) Credit 5.
Must be preceded by Machine Design I and Strength of Materials II. Design of machine parts of high speed machinery, such as internal combustion engines.
Text same as for Machine Design I.

ME 20 ENGINES AND BOILERS. (5 plus 0) Credit 5.
Must be preceded by Chemistry II and Physics I. An introductory course covering fuels and combustion, steam engines and turbines, boilers, stokers, gas and oil engines.
Steam Power and Internal Combustion Engines—Craig and Anderson.

ME 21 THERMODYNAMICS. (5 plus 0) Credit 5.
Must be preceded by Engines and Boilers and Mathematics 5. The fundamental principles of the conversion of heat into mechanical power; the thermodynamic processes of steam and gases; and the efficiencies and capacities of engines.
Elements of Thermodynamics—Young and Young.

ME 25 MECHANICAL LABORATORY I. (0 plus 6) Credit 2.
Must be preceded by Thermodynamics. Principles and methods of laboratory testing of mechanical equipment and power machinery.
Mechanical Laboratory Methods—Smallwood.
Laboratory Fee, Per Term, $3.00.

ME 30 INTERNAL COMBUSTION ENGINES. (5 plus 0) Credit 5.
Must be preceded by Thermodynamics. A study of conversion of energy and heat losses with reference to Otto and Diesel cycles, including study of fuels, carburetion, design of valves, valve mechanism, lubrication, engine balancing, performance.
Internal Combustion Engines—Maleev.

ME 31 INTERNAL COMBUSTION ENGINE DESIGN. (3 plus 6) Credit 5.
Must be preceded by Thermodynamics. The design of the principal parts of an automobile, aviation or Diesel engine.
Text same as for Internal Combustion Engines.

ME 32 REFRIGERATION. (5 plus 0) Credit 5.
Must be preceded by Thermodynamics. The thermodynamics of refrigeration, compression and absorption systems, refrigerants, commercial plants and equipment.
Refrigeration Engineering—MacIntyre.

ME 34 REFRIGERATION DESIGN. (3 plus 6 Credit 5.
Must be preceded by Refrigeration. Design of a commercial refrigeration plant.
Text same as for Refrigeration.

ME 35 HEATING AND AIR CONDITIONING I. (5 plus 0) Credit 5.
Must be preceded by Engines and Boilers. The loss of heat from buildings; steam and hot water and warm air systems of heating; mechanical equipment of heating systems.
Heating and Air Conditioning—Allen and Walker.

ME 36 HEATING AND AIR CONDITIONING II. (5 plus 0) Credit 5.
Must be preceded by Heating and Air Conditioning I. Theory and principles of air conditioning, methods and current practice, equipment now available.
Text same as for Heating and Air Conditioning I.

ME 37 HEATING AND AIR CONDITIONING DESIGN. (2 plus 9) Credit 5.
Must be preceded by Heating and Air Conditioning I, and accompanied by Heating and Air Conditioning II. Determination of the heating and conditioning requirements of a building, selection of equipment, and preparation of plans and specifications.
Text same as for Heating and Air Conditioning I.

ME 45 MECHANICAL ENGINEERING SEMINAR. (3 plus 0) Credit 3.
Eighth term only. Preparation of reports on selected items of current practice events, developments and trends in Mechanical Engineering.
Technical Magazines and Reports of Engineering Society Meetings.

MECHANICAL DRAFTING

ED 1 ENGINEERING DRAWING I. (0 plus 6) Credit 2.
Use of instruments, engineering lettering, principles of orthographic projection.
Engineering Drawing—French.

ED 2 ENGINEERING DRAWING II. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing I. Working drawings, detail and assembly.
Text same as for Engineering Drawing I.

ED 3 ENGINEERING DRAWING III. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing II. Field notes and sketches, machine drawing, pictorial representation.
Text same as for Engineering Drawing I.

ED 4 ENGINEERING DRAWING IV. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing III. Advanced drawing, conic sections, and current drafting room practice.
Text to be selected.

ED 5 TRACING. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing III. For Mechanical Drafting Course students only. Tracing of selected blue prints, to promote speed and accuracy.

ED 10 DESCRIPTIVE GEOMETRY. (0 plus 9) Credit 3.
Must be preceded by Plane Geometry and Engineering Drawing II. Origin, definition. and application of Descriptive Geometry; representation of the point, the line, and the plane; orthographic and double orthographic projection; bisecting planes; profile planes; fundamental problems of geometry of position.
Descriptive Geometry—Schumann.

RADIO ENGINEERING

RE 2 RADIO THEORY II. (5 plus 0) Credit 5.
Must be preceded by Elementary Electricity and Magnetism and Elementary Electrical Machines. Properties of coils and condensers; vacuum tube characteristics; characteristic curves, the vacuum tube as an ampllifier; study and design of audio amplifiers including a study and use of the decibel.
Fundamentals of Radio—Terman.

RE 2A RADIO LABORATORY 2A. (0 plus 4) Credit 2.
Laboratory experiments on vacuum tubes and their applications, properties of resonant circuits, measurements of selectivity, study of and use of vacuum tube voltmeters and cathode-ray oscillograph.
Tech Laboratory Instruction Sheets.
Laboratory Fee, Per Term, $3.00.

RE 3 RADIO THEORY III. (5 plus 0) Credit 5.
Must be preceded by Radio Theory II. High frequency amplifiers; detection; receiving systems; rectifiers; oscillators; transmitters; antennas; transmission; study of television.
Text same as for Radio Theory II.

RE 3A RADIO LABORATORY 3A. (0 plus 4) Credit 2.
A course covering primarily the design of public address systems and broadcast technique in both sound and television, stressing the practical applications of theory.
Tech Laboratory Instruction Sheets.
Laboratory Fee, Per Term, $3.00.

RE 4 RADIO ENGINEERING I. (5 plus 0) Credit 5.
Must be preceded by Trigonometry and Radio Theory III. An advanced course in the operation and theory of resonant and coupled circuits, fundamental properties of vacuum tubes, triode amplifiers, circuit constants and radio frequency amplifiers.
Principles of Radio Engineering—Glasgow.

RE 4A RADIO MEASUREMENTS I. (1 plus 6) Credit 3.
Laboratory experiments on modern methods of high and low frequency measurements, such as: Q of circuits; impedance of transmission lines and antennas; studies of class B and C amplifiers; alternating current bridges.
Measurements in Radio Engineering—Terman.

RE 5 RADIO ENGINEERING II. (5 plus 0) Credit 5.
Must be preceded by Radio Engineering I. Continues the study of oscillators, detectors, modulators, radio transmitters, radio receptors, antennas, propagation of radio waves, directional arrays, power supplies, etc.
Text same as for Radio Engineering I.

RE 5A RADIO MEASUREMENTS II. (1 plus 6) Credit 3.
Continuation of Radio Measurements I.

RE 7 COMMUNICATION ENGINEERING I. (5 plus 0) Credit 5.
An advanced course stressing broad principles rather than specific design covering the following: Complex quantities, network theorems, resonance, infinite lines, reflections, filters, coupled circuits, and impedance matching.
Communication Engineering—Everitt.

RE 8 COMMUNICATION ENGINEERING II. (5 plus 0) Credit 5.
Continuation of Communication Engineering I covering audio amplifiers; radio frequency amplifiers for reception; class B and C amplifiers for transmission; modulation, demodulation; detectors; oscillators; electro-mechanical coupling; radiation.
Text same as for Communication Engineering I.

RE 9 TRANSIENT CURRENTS (5 plus 0) Credit 5.
Transient states; behavior of inductance; behavior of condensers, circuit equations; networks; response to A.C.; coupled resonant circuits, traveling waves, operational method of analysis.
Transient Electrical Currents—Skilling.

RE 12 RADIO SHOP (0 plus 6) Credit 2.
Fundamentals of radio shop and repair practice; construction of predesigned circuits.

RE 103 RADIO DESIGN. (1 plus 4) Credit 3.
A practical course in the design of radio transmitters, receivers, and public address systems from a manufacturing standpoint, especially as to production, efficiency, and cost.

RE 110 SEMINAR. (3 plus 0) Credit 3.
Open only to advanced students. Lectures and consultations on recent radio developments and present current engineering opportunities.

RE 120 THESIS. (0 plus 10) Credit 5.
Investigation of a problem of an electrical nature in the laboratory or in industry.

CO CODE 1, 2, and 3. Credit 2 hrs. each.
Passing requirements 13, 18, and 22 words per minute respectively in transmission and reception of International Morse Code.
Laboratory Fee, Per Term, $3.00.

From the Mayor of Fort Wayne:

I am writing this letter to you to go on record in appreciation of the worthiness of Indiana Technical College as an outstanding institution of Fort Wayne.

Your firm establishment and solid growth as a School of Engineering and Technology is due to the fact that you are rendering earnest and efficient service in making your fine institution a real school of learning.

You are proving that there is a definite place among our educational institutions for a school that covers the essentials of an engineering education in two years instead of the traditional four.

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Please Keep for Reference